NETWORK WORLD

October 21, 1991

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NETWORK WORLD

Apple

SERIES

NEWS

With virus infections and other network security problems on the rise, *Network World* teamed up with NCSA, an

ftware ch, in signed iruses and restore infected files to their original state. In practice, however, the test found

(continued on page 68)

gement platform, Digment Corp. plans to on an earlier promise a Unix version of its ement Control Center Director net manageire by the middle of

so considering making an operating system-independent version of DECmcc Director available to other vendors through its Open Network Licensing (ONL) program. That could lead to the availability of DECmcc Director-based systems on a variety of hardware and operating environments.

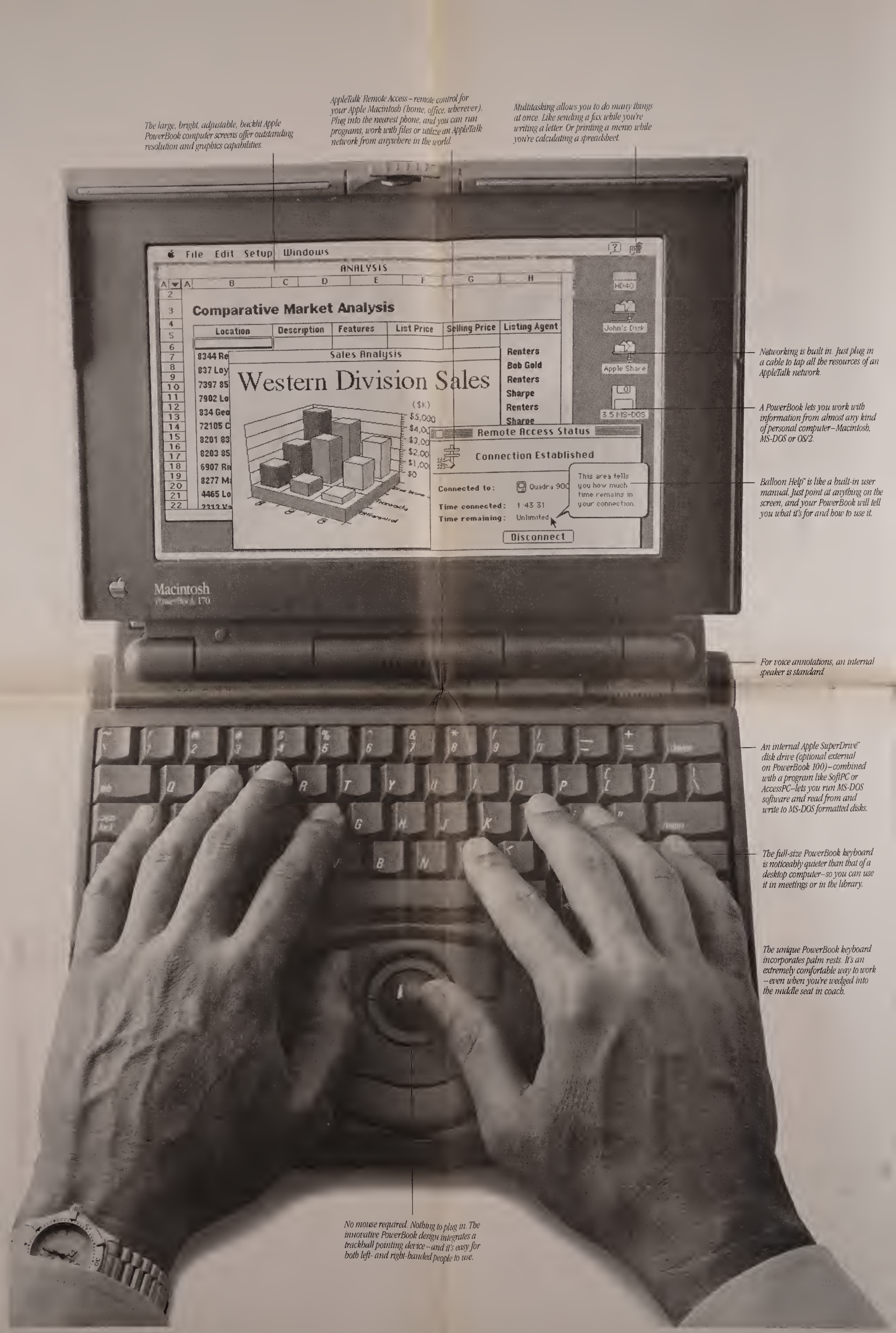
Currently, Bell Atlantic Soft-

(continued on page 72)

We asked people what they wanted from

the next generation of Apple technology.

They had only four modest requests.



The large, bright, adjustable, backlit Apple PowerBook computer screens offer outstanding resolution and graphics capabilities.

AppleTalk® Remote Access – remote control for your Apple Macintosh (home, office, wherever). Plug into the nearest phone, and you can run programs, work with files or utilize an AppleTalk network from anywhere in the world.

Multitasking allows you to do many things at once. Like sending a fax while you're writing a letter. Or printing a memo while you're calculating a spreadsheet.

Networking is built in. Just plug in a cable to tap all the resources of an AppleTalk network.

A PowerBook lets you work with information from almost any kind of personal computer – Macintosh, MS-DOS or OS/2.

Balloon Help™ is like a built-in user manual. Just point at anything on the screen, and your PowerBook will tell you what it's for and how to use it.

For voice annotations, an internal speaker is standard.

An internal Apple SuperDrive™ disk drive (optional external on PowerBook 100) – combined with a program like SoftPC or AccessPC – lets you run MS-DOS software and read from and write to MS-DOS formatted disks.

The full-size PowerBook keyboard is noticeably quieter than that of a desktop computer – so you can use it in meetings or in the library.

The unique PowerBook keyboard incorporates palm rests. It's an extremely comfortable way to work – even when you're wedged into the middle seat in coach.

No mouse required. Nothing to plug in. The innovative PowerBook design integrates a trackball pointing device – and it's easy for both left- and right-handed people to use.

Freedom.

It's more than a new computer. It's a new idea. It does everything that you want a computer to do.

But it's nothing that you expect a computer to be.

It will let you run Macintosh® software. It will let you run MS-DOS software.*

It will let you run away.

It can talk to fax machines. It can talk to computers. It can talk.

It will record your thoughts, your visions, your inspirations and your voice.

Introducing PowerBook.

It makes your numbers scream, your words sparkle and your colleagues envious.

It's easy on your arms. It's easy on your hands. It's easy on your eyes. It's easy.

It does more than you imagine. And it costs less than you think.

It's for students and teachers, accountants and attorneys, publishers and poets.

People in sales, people in government, people named Seth who live in Vermont. It's for you.

The power to work anywhere you want. Anytime you want. In whatever way works best for you.

And it comes in your choice of three powers: powerful, very powerful and remarkably powerful.

It's the Apple® PowerBook.™ It's freedom.

*All you need is a simple program like SoftPC.

A PowerBook fits easily in a briefcase.

Plug in an external hard disk or other peripherals here.

Plug in a microphone to record your voice (140/170 only).

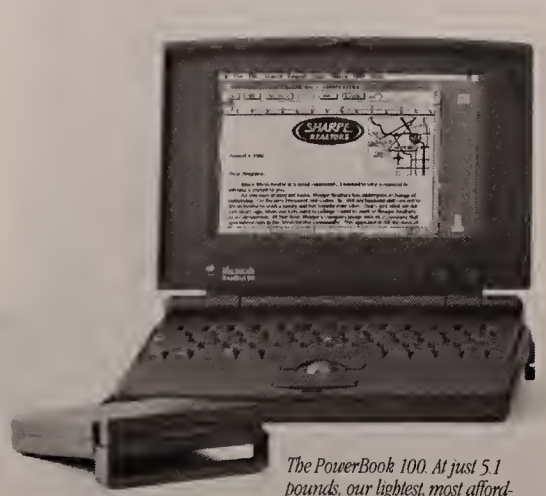
Plug in an external speaker here.

Plug in a data/fax modem here.

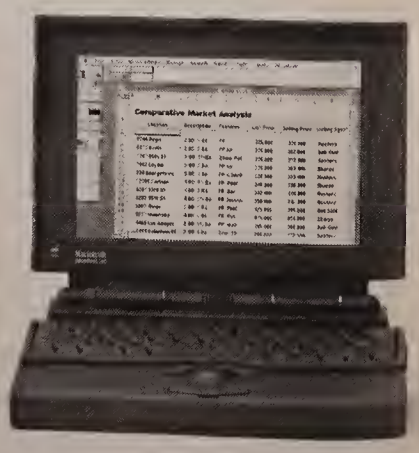
Plug a phone line in here. A data/fax modem is standard on the PowerBook 170. (Optional on PowerBook 100/140.)

If you prefer using a mouse, plug it in here.

Plug in a printer, a network or another PowerBook here.

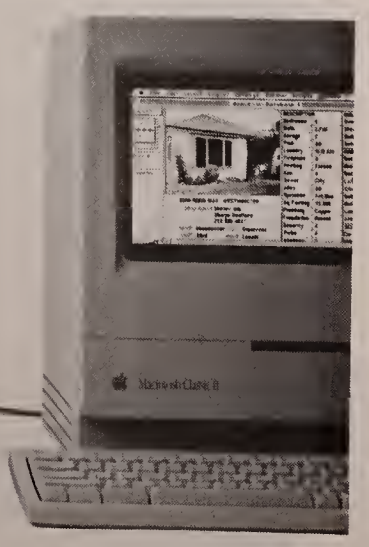


*The PowerBook 100. At just 5.1 pounds, our lightest, most affordable PowerBook outperforms comparably configured 286-based computers running Windows 3.0.** It has a backlit supertwist display and comes standard with 2MB of memory (expandable to 8MB). A standard 20MB hard disk drive provides enough storage for most people. An internal data/fax modem and external Apple SuperDrive (at left) are optional.*



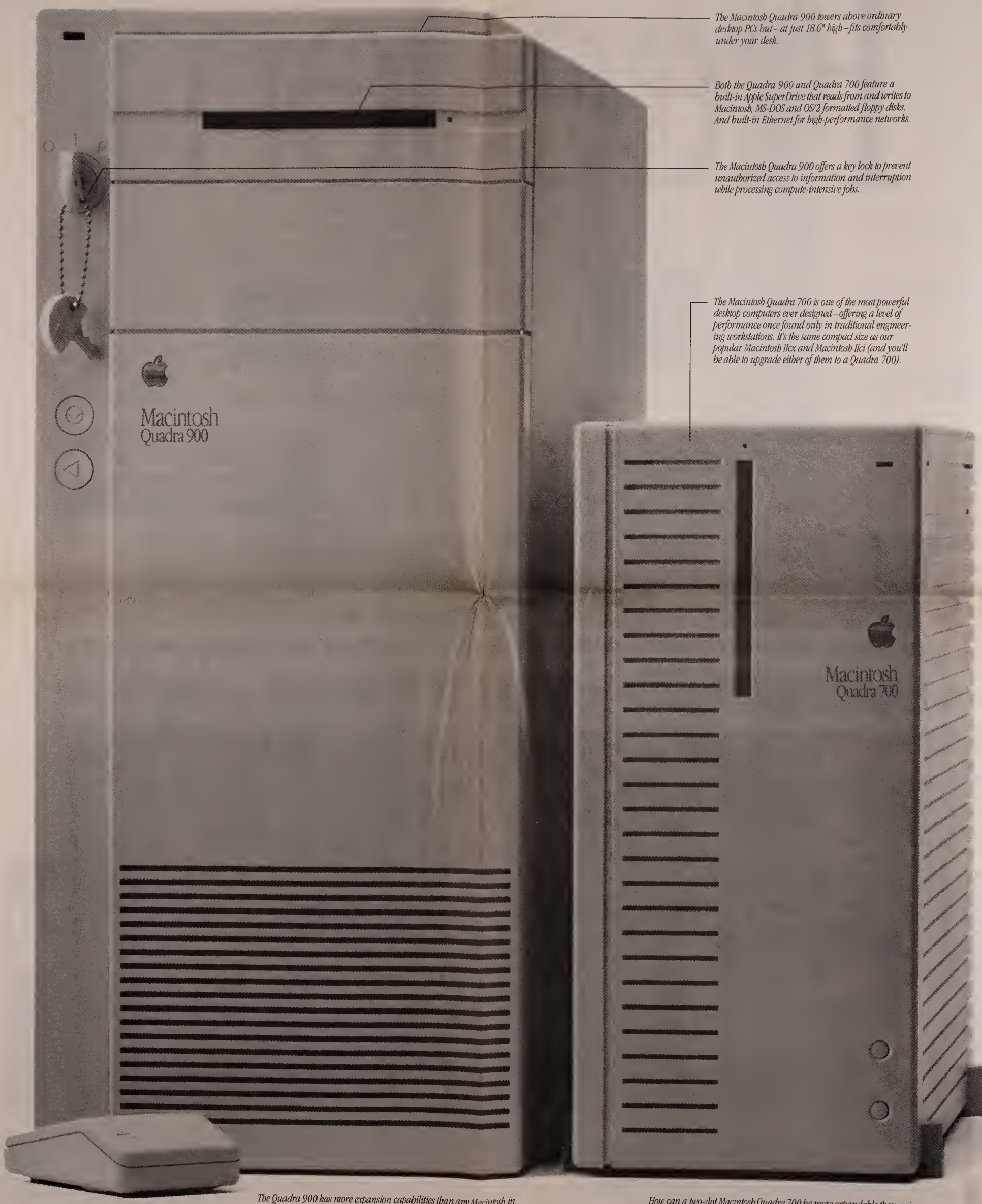
*The PowerBook 140. Based on the Motorola 68030 processor, it outperforms comparably configured 386sx-based PCs running Windows 3.0.** It weighs just 6.8 pounds. It has a high-resolution, backlit supertwist display, a built-in Apple SuperDrive floppy disk drive and either 2MB or 4MB of memory (expandable to 8MB). You can choose a 20MB or 40MB internal hard drive for plenty of storage, and an optional internal data/fax modem.*

*The PowerBook 170. It's more powerful than most desktop computers – with performance comparable to desktop 486sx-based PCs running Windows 3.0.** It weighs only 6.8 pounds and features a backlit, razor-sharp active-matrix screen for the most responsive performance with graphics. A Motorola 68882 math coprocessor is standard, as are 4MB of memory (expandable to 8MB), virtual memory, an internal data/fax modem, an internal Apple SuperDrive, a 40MB hard drive and a microphone.*



Over a network, an Apple PowerBook can talk to any Macintosh, most MS-DOS PCs and many mainframe computers. Its built-in networking and file-sharing capabilities make it especially easy to exchange information with any Macintosh personal computer or even another PowerBook – all you need is a simple cable.

**Comparisons are based on a 1991 independent research study conducted by Ingram Laboratories that tested a variety of personal computers running applications available for both the Macintosh and Microsoft Windows 3.0 environments.



The Macintosh Quadra 900 towers above ordinary desktop PCs but – at just 18.6" high – fits comfortably under your desk.

Both the Quadra 900 and Quadra 700 feature a built-in Apple SuperDrive that reads from and writes to Macintosh, MS-DOS and OS/2 formatted floppy disks. And built-in Ethernet for high-performance networks.

The Macintosh Quadra 900 offers a key lock to prevent unauthorized access to information and interruption while processing compute-intensive jobs.

The Macintosh Quadra 700 is one of the most powerful desktop computers ever designed – offering a level of performance once found only in traditional engineering workstations. It's the same compact size as our popular Macintosh IIcx and Macintosh IIci (and you'll be able to upgrade either of them to a Quadra 700).

The Quadra 900 has more expansion capabilities than any Macintosh in Apple history. And both Quadra models have high-speed NuBus slots with up to twice the performance of previous NuBus slots.

How can a two-slot Macintosh Quadra 700 be more expandable than a six-slot something else? Because connections for virtually everything you need are built in – you don't need extra-cost cards like you do on most PCs.

Power.

It's blistering speed for your hottest ideas. Brute force with impeccable manners.

It's the new Macintosh Quadra.™ The first line of Macintosh computers based on the high-performance Motorola 68040 microprocessor.

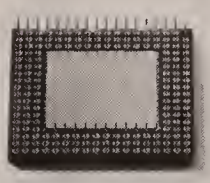
If you are an aficionado of silicon design, you will appreciate how the 68040 integrates a processor, math coprocessor, memory controller and dual

Introducing Macintosh Quadra.

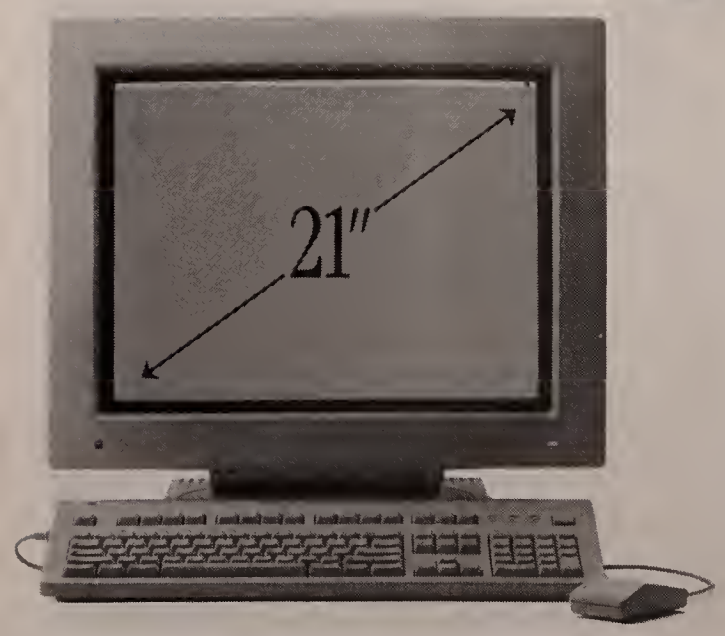
memory caches into a single elegant chip. And how Quadra supports it with high-performance subsystems across the board: Ethernet networking, 24-bit video support, and faster SCSI ports and NuBus™ slots.

If you don't happen to know a computer chip from a potato chip, however, you'll appreciate how all this speed and power is now accessible to you in an exceedingly civilized form.

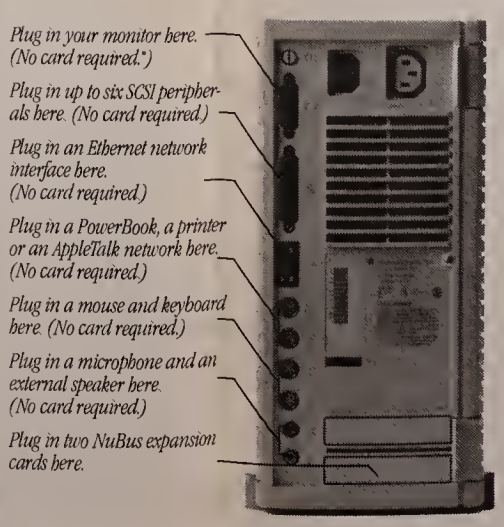
Because it's not just a new level of performance. It's a new level of Macintosh.



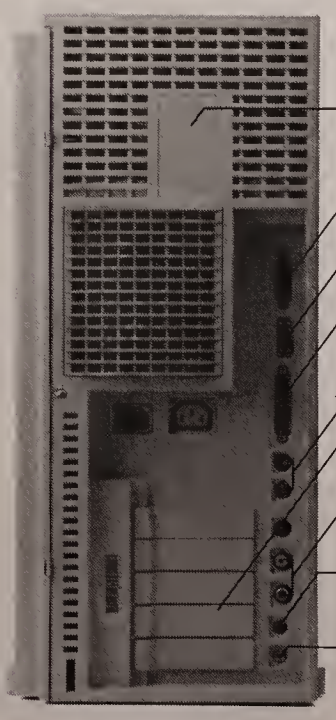
The heart of the new Macintosh Quadra is the blistering Motorola 68040. It's not merely a faster version of the 68030–it's a totally new design integrating a memory-management chip, a floating-point coprocessor and dual memory caches. (Which means up to twice the performance of any previous Macintosh.)



The new Macintosh 21" Color Display offers the brilliant color and corner-to-corner sharpness that Apple monitors are famous for–with enough room for two full-size 8 ½" x 11" pages. It's an ideal companion to the Macintosh Quadra 700 or Macintosh Quadra 900.



Quadra 700 (rear view)



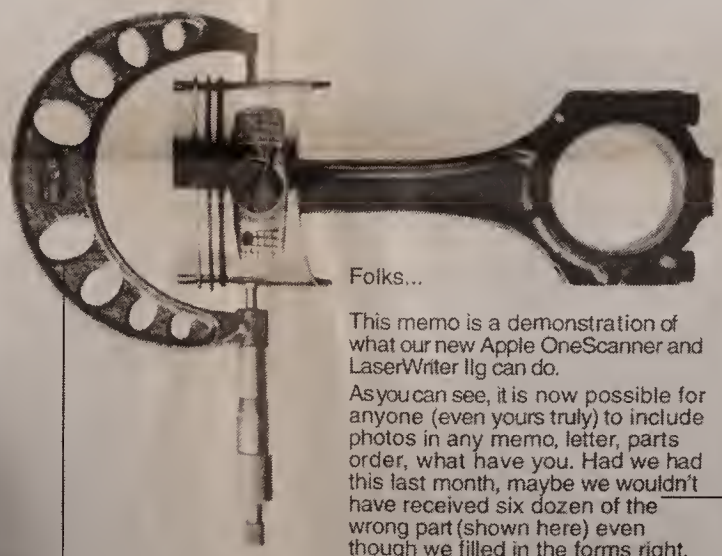
Quadra 900 (rear view)

**Both Macintosh Quadra computers offer built-in video support for all Apple and many third-party monitors–so you don't have to buy a video card. With optional video RAM, they can display up to 16.7 million colors on a 16" monitor (24-bit mode) or up to 256 colors on a 21" monitor (8-bit mode). Pump image was created by Joe Guagliando with MacBRAVO! MacBRAVO! is a registered trademark of Schlumberger Technologies, Inc. Orbiter image was created with MicroStation Mac. MicroStation is a registered trademark of Bentley Systems Inc., an Intergraph affiliate.*

With the Apple OneScanner, a LaserWriter IIf or IIg and any Macintosh, anyone can create memos like this.

PhotoGrade allows the new LaserWriter printers to produce pages which rival the print quality of 800-dpi printers costing much more.

MEMO



Folks...

This memo is a demonstration of what our new Apple OneScanner and LaserWriter IIg can do.

As you can see, it is now possible for anyone (even yours truly) to include photos in any memo, letter, parts order, what have you. Had we had this last month, maybe we wouldn't have received six dozen of the wrong part (shown here) even though we filled in the forms right.

So from now on, don't just say it—show it.

Bob Speltord

It takes a lot of power to produce pages like the one you see here. Fortunately, the LaserWriter IIf and IIg have plenty of it: a Motorola 68030 microprocessor and plenty of memory (expandable to 32MB), and special circuits designed to speed up the processing of graphics-intensive pages. The IIg also has built-in Ethernet for high-performance networks.

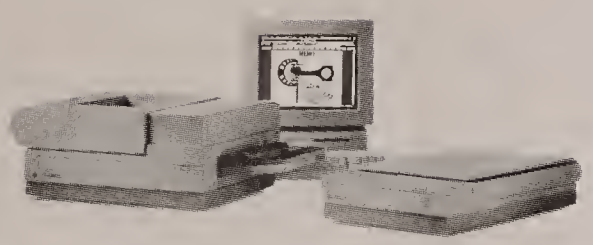
Apple's PhotoGrade technology is a major breakthrough in printing technology that reproduces the subtle tones of gray in black-and-white photographs and makes even simple charts and graphs look dramatically better.

If you can see it, you can scan it. Photos, illustrations, small objects, even your signature.

The OneScanner can automatically scale, crop and even rotate your photographs, too.

Razor-sharp text and graphics are the result of Apple's new FinePrint™ technology. It's a new standard of quality for the average desktop brought to you by Apple's new LaserWriter printers.

Simplicity.



With our remarkable new scanner, the Apple OneScanner,™ it takes just one click of a Macintosh mouse to add high-quality black-and-white photos to your letters, proposals and presentations.

Click again, and the new Apple LaserWriter® IIf or LaserWriter IIg delivers your work with a level of quality never before seen on the average desktop – thanks to a new technology called PhotoGrade.™*

Introducing One-Step Scanning & PhotoGrade Printing.

It's never been so easy to look so impressive. It's never been so simple to say so much so quickly.

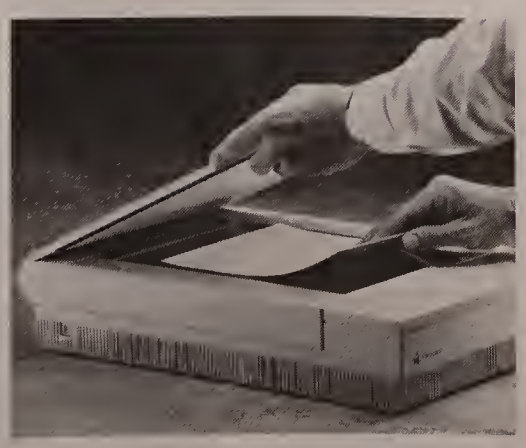
When you include photographs, your briefs can be briefer. Your notes, more notable.

You can do less writing and more showing. People will see exactly what you're talking about.

In a sea of memos, yours will swim to the top. In an ocean of proposals, yours pop to the surface.

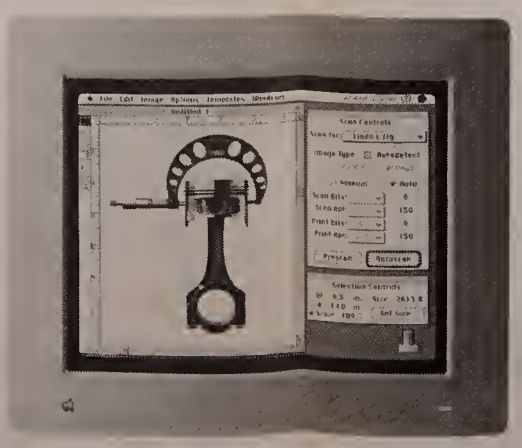
Your work will look better than ever. And the world will never look the same again.

**The LaserWriter IIf requires an additional 4MB of memory to take advantage of PhotoGrade.*



Autoscan

The new Apple OneScanner. Place the photograph (don't bother to straighten it). Click the mouse. The OneScanner does everything else. It evaluates the image, adjusts brightness and contrast and scans the photo into your Macintosh. Then, it even straightens and crops your image automatically. A perfect scan with one touch of a button.



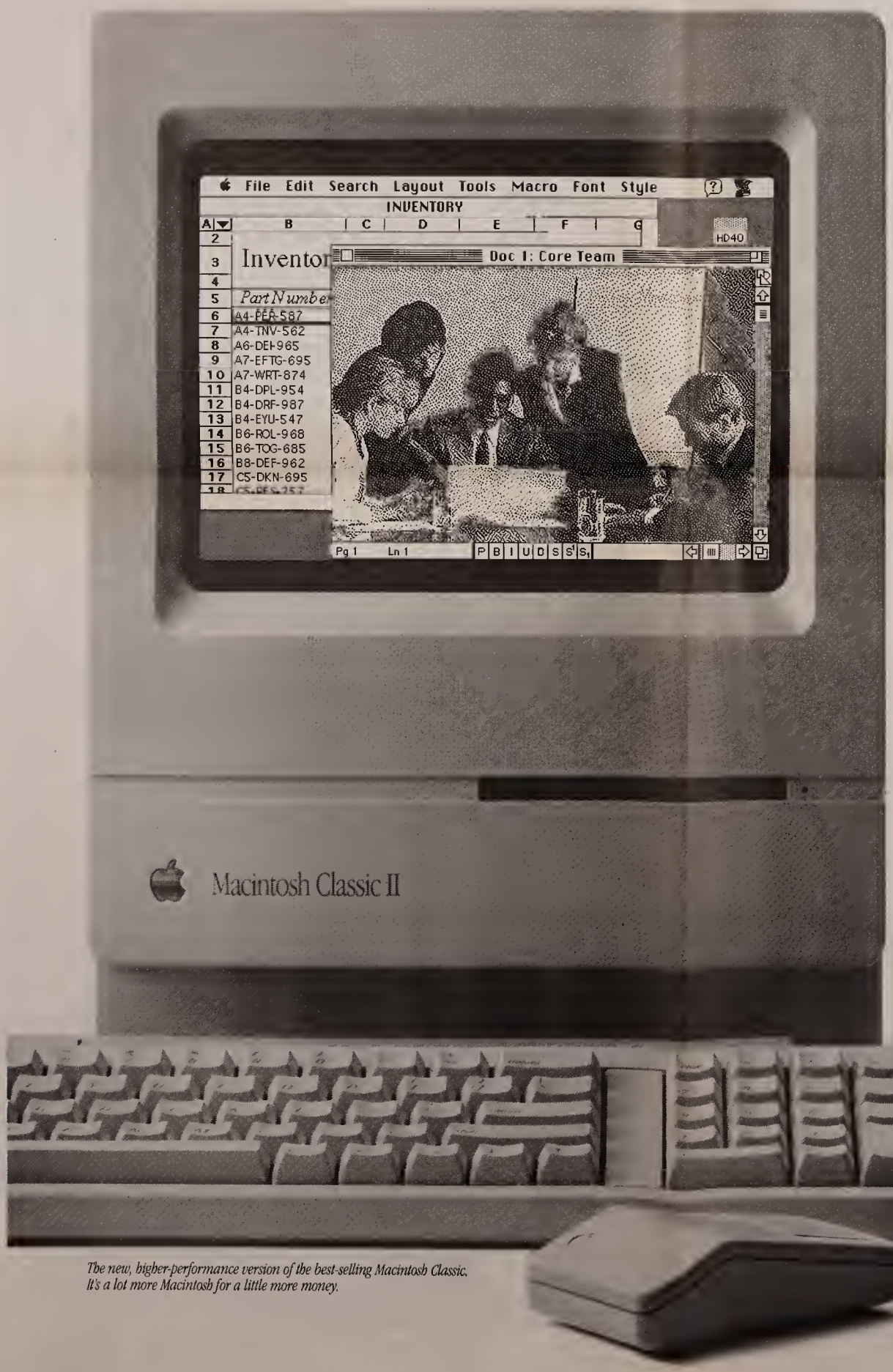
Paste

It takes just a few seconds for a photograph, artwork or any other image you've scanned to appear on your Macintosh screen. Then, you just copy and paste it into a document. Or, you can scale it, rotate it or manipulate it in a thousand ways. (This is made possible by the Ofoto™ software included with the OneScanner.) When you're ready, simply print.

Print

The new Apple LaserWriter IIg. Although any Apple LaserWriter can print photographs, the new Apple LaserWriter IIg and IIf are the first gray-scale, near-photographic-quality printers almost any business can afford. They also print significantly sharper text and business graphics.

Humanity.



The new, higher-performance version of the best-selling Macintosh Classic. It's a lot more Macintosh for a little more money.

Last year, we took the most human computer of all and made it affordable enough for millions more humans.

In short order, the Macintosh Classic® became the fastest-selling computer in Apple history.

Introducing the Macintosh Classic II.

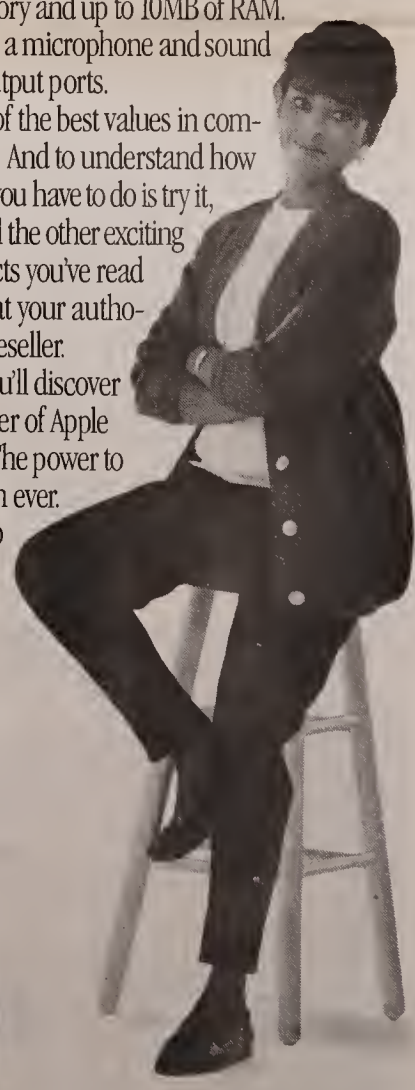
The new Macintosh Classic II offers twice the performance of its best-selling predecessor. Yet it costs just a few dollars more.

It's easy to set up and use. It runs thousands of business and educational programs. And it has built-in file sharing and networking.

But it also features the same Motorola 68030 processor that powers our Macintosh II computers. Virtual memory and up to 10MB of RAM. And includes a microphone and sound input and output ports.

It's one of the best values in computing today. And to understand how valuable, all you have to do is try it, along with all the other exciting Apple products you've read about here, at your authorized Apple reseller.

Then you'll discover the new power of Apple technology. The power to do more than ever. The power to be your best.®



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MarketBriefs

Client/Server Computing

NETWORK WORLD

What is client/server computing?

These days, it seems everyone is talking about client/server computing.

Just about every vendor is staking claim to the territory of client/server computing and pundits of every stripe are voicing almost messianic fervor about the concept.

Despite all the hubbub, it isn't clear everyone is talking about the same thing. In fact, different camps are putting their own spin on client/server in the hopes of shaping your thinking to their advantage.

It's easy to get confused about client/server. It is, however, a logical next step in computing, brought about by networking and other advances, that will help many users maximize their investments in information technology and make it easier for end users to take advantage of the incredible wealth of information and processing power deployed throughout corporate America.

A simple answer

Simply stated, client/server computing is an information systems architecture in which any device in a network can obtain information or computing services from any other device. When a device seeks data or processing power, it's a client. When it provides those, it's a server.

Client/server is an architecture that makes sense for many, but not all, companies and many, but not all, applications.

Gauging the size of the client/server market

One of the best indicators of the size and growth of the client/server market would be products related to LANs; namely, LAN hardware, servers, operating systems, and distributed/networked application software. International Data Corporation (IDC) predicts that local-area network worldwide revenues should expand at a 13% compound-annual-growth between 1991-1994; more than twice the growth (5.6%) in multiuser systems revenues for the same time period.

Worldwide Revenues in $Millions

	1991	1994
PC LANs*	$2,650	$3,461
LAN Servers	$5,649	$8,462
PC LAN Operating Systems	$1,495	$2,078
PC LAN Applications	$558	$1,040

*network interface cards

Source: International Data Corporation (1991)

Some myths about client/server

In understanding client/server computing, it helps to recognize some of the myths about client/server.

▲ Client/server isn't a product, or a set of products or services from any one supplier. Client/server isn't something you can buy and nobody owns client/server. In fact, vendors have their work cut out in order to supply all

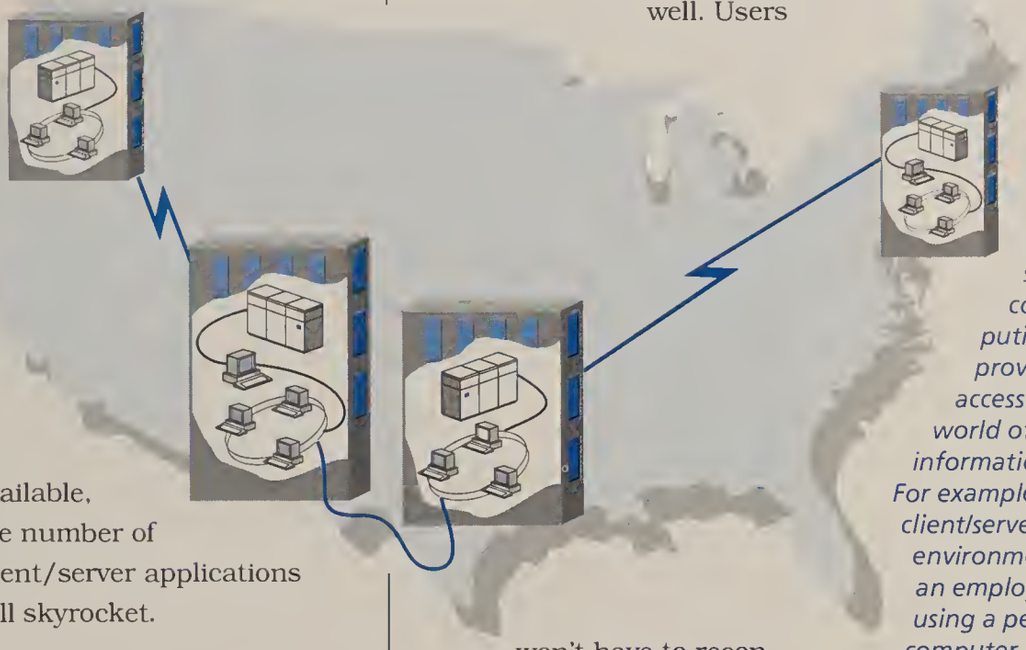
the key components needed to make client/server a reality in user sites.

▲ Client/server isn't a credo to which you must convert. Nor is it a revolution. Instead, it's an evolutionary advance in information systems that can help companies make the most of their powerful networks and the incredible processing power available at the desktop, midrange and in the data center today.

But client/server is only right if it makes sense for your company. It won't be feasible for certain applications and it won't be possible for many others for some time to come.

▲ Client/server isn't simply a LAN issue, although LANs are playing a vital role in helping many companies adopt client/server computing. It isn't simply a network issue, although networks are the lifeblood of client/server. It isn't just an applications or data base issue, though advances in these areas are making client/server possible. And it isn't simply a computer issue, though client/server promises to help companies utilize processors more fully.

▲ Client/server isn't the future, it's here and now. While it isn't easy to implement client/server, pioneering users are today building impressive distributed processing systems on the client/server model. As more products become available, the number of client/server applications will skyrocket.



▼ *Client/server computing provides access to a world of information. For example, in a client/server environment, an employee using a personal computer can access information or use processing on the LAN server or other computers, local or remote. Client/server provides the foundation for an enterprise network.*

What's driving the shift to client/server computing?

Users are looking for a way to bring together all the islands of information and processing power throughout their organizations. The client/server model provides a useful blueprint for moving to distributed processing.

Client/server allows users to apply processing resources and distribute information in the most logical way. For example, powerful personal computers can be used to support rich user interfaces, local applications, query tools and other functions and can tap into larger processors — LAN servers, superservers, minis and mainframes — for data or number crunching power.

Client/server computing provides for scalability, as well. Users won't have to reconfigure their information systems each time computing needs change. Computing and network tasks can be shifted to more powerful devices without affecting end users. Thus, client/server provides the flexibility and the growth path companies have sought for years.

In the words of the vice president of a large computer retailer, "One of the most important developments in the evolution of computing is the client/server model."

Client/server computing makes it easier for end users to access information transparently and provides for more cost-effective use of computing and network resources. It can help companies make decisions more quickly and empower employees to serve customers better.

> An enterprise network built on the client/server computing model is a powerful business weapon.
>
> John Gallant, *Editor*
> *Network World*

Survey: Customer Response to Client/Server Computing

A survey focusing on 750 Fortune 1000 sites, conducted by Business Research Group (BSG), Newton, MA in 1990, confirms a high level of customer response to client/server computing, specifically:

42% currently implement client/server computing and 24% plan to implement in 18-24 months.

The server and primary use/functions — both current and planned — are numerous (12) with peripheral sharing, file sharing, and storage and retrieval cited by 90% of the respondents.

As reported in *Network World* (11/19/90), the BSG research also showed that mainframes and minicomputers are perceived as viable servers in larger IS shops. The client/server strategy is but one component in the larger issue of network integration. Of those that responded that their organization uses/plans to use servers, the following chart is the breakdown of their responses.

Server Platforms Employed by Companies*

Dedicated 80386-based PCs	52%
Minicomputers	30%
Mainframes	29%
Nondedicated 80386-based PCs	27%
Nondedicated 80286-based PCs	20%
Engineering Workstations	7%
Other PCs	7%
Dedicated 80486-based PCs	4%

*Multiple responses allowed

Source: Business Research Group, Newton, MA (1990)

What's behind it all?

A number of important technological and organizational shifts are driving client/server computing within organizations today. These include:

▲ **The expanding reach and capacity of enterprise networks.** Today, many corporations have provided the physical connectivity between sites and processors that will serve as the foundation of client/server computing. Companies want to leverage this network investment by moving beyond simple functions such as file sharing to sophisticated client/server applications and true distributed processing.

▲ **The rapid deployment and increasing power of LANs.** LANs today not only provide a means for end users in a workgroup to share information and peripherals, they also provide an ideal gateway through which users can access resources throughout the company.

▲ **The incredible power and widespread deployment of desktop devices.** Today's personal computers and workstations offer the functionality and power once provided only by host processors. Yet, they are often relegated to very simple roles — such as terminal emulation — in current computing architectures. Client/server promises to make these devices full partners in the world of distributed processing, helping users get the most from their expenditure on personal processing power.

▲ **The emergence of distributed data base management systems.** Data base suppliers today are providing sophisticated data storage and manipulation products that allow users to choose the most appropriate methods and locations for information storage and support transparent access to data across an enterprise.

▲ **Growing support for open systems standards.** Computer, software and network vendors are embracing open systems standards that enable users to combine products and services from a variety of suppliers in building a distributed processing environment.

▲ **Emergence of true "networked" applications.** Users and software makers alike are developing a whole new generation of applications that take advantage of network capabilities and the client/server model. These applications are the value-added business tools that take advantage of client/server computing.

▲ **Changes in corporate America.** Many companies today are decentralizing operations and pushing more decision-making out to employees in order to respond more quickly to customer needs. Client/server computing empowers workers to react to changing market conditions and provide quality service to customers.

Survey: User Attitudes Toward Client/Server Computing

IDC completed a comprehensive survey of 1,850 computer sites in early 1991. Among the many topics covered, the question of client/server computing (without being defined) generated a 41% positive response, including 21% that have moved/are moving to client/server, 11% with plans to move, and still another 9% wanting to move but unsure of the best way to go. This shift is expected to have widespread effects throughout the information-processing industry: namely, wider deployment of LANs; increased acquisition of open systems and software solutions; and closer scrutiny of wide-area-network architecture to improve support of LANs and client/server computing.

In terms of senior systems at the sites surveyed, those with IBM 370 architecture, DEC VAX VMS or multiuser Unix as dominant systems have the highest levels in pursuing client/server architecture, 39%, 39%, and 35% respectively. Those sites least likely (22%) to employ client/server are those with IBM AS/400s as the senior system.

When looked at by vertical market, miscellaneous services (42%), business services (41%), and nondurable manufacturing (41%) show the greatest level of implementation/pursuit of the client/server goal. At the other extreme, health services (16%) and other durable manufacturing (22%) register the lowest responses. The sites with the highest degree of skepticism — believing that client/ server is merely a buzzword — come from the insurance/other finance (45%) and wholesale (41%) industries, rates much higher than the overall (28%) response.

The price/performance advantage

IDC's survey also explored budgeting factors' effect on server purchases. In situations where management says to cut costs to meet budget restrictions, the client/server approach has the edge. The price/performance advantage for systems comprised of workstations, personal computers, LANs, and micro-based servers matched up against the raw computing power of mainframes and minicomputers gives the nod toward server-based solutions.

Another budgetary consideration relative to users' buying plans is the effect of competitive pressure. IDC's survey shows that perceived competitive pressure is a strong indicator of intention to purchase a LAN server in 1991. As echoed by an industry analyst at the Newton, Mass.-based research firm Business Research Group, "client/server applications are seen as a way of making a company more competitive." The reasoning likely goes as follows: if we're going to catch, or stay ahead of, the competition, then LAN servers are the technology we need.

"client/server applications are seen as a way of making a company more competitive"

Obstacles to client/server

Client/server computing isn't a pie-in-the-sky concept. It's been embraced by many leading users and vendors, who are working to make it a reality.

But there are some obstacles that have to be overcome on the road to client/server. They include:

▲ **More widespread support for network and computing standards from vendors and users.** While support for standards has increased in the past few years, users are still often forced to implement incompatible, proprietary products because no standards-based solutions exist. That makes it difficult to implement a client/server architecture.

A growing number of users are voting for standards, by requiring standards support in proposals (RFPs). That trend will spur greater availability of standards-based products in the future.

▲ **More sophisticated network and data management tools.** In order for distributed processing to work, users need powerful tools for keeping their networks up and running, as well as for backing up data and handling other key adminstrative and management tasks. These products have evolved over the years for centralized processing architectures. But client/server will require its own tools.

▲ **More robust data base products.** While Data Base Management Systems (DBMSs) have come a long way in terms of ease of use and other features, they still have a ways to go to become true distributed data base offerings. In order to support a client/server model, data bases must support enterprise-wide update capabilities, more sophisticated data integrity and backup features, as well as other functions.

▲ **More "invisible" network intelligence.** Network, computing and applications offerings must provide a wealth of transparent features that enable end users to quickly and easily locate and access data across an enterprise, as well as initiate processing tasks, combine multiple types of information — i.e. text, graphics, video — and communicate with other users.

In order to support a client/server model, data bases must support enterprise-wide update capabilities, more sophsticated data integrity and backup features, as well as other functions.

▲ **Better, simpler applications development tools.** In addition to end-user oriented tools that enable workers to easily access and manipulate data from multiple sources, companies need a new generation of development tools for quickly developing mission-critical client/server applications.

▲ **A whole new generation of packaged applications.** Today's applications are designed primarily for single users or for multiple users on a single processor. Applications suppliers face the challenge of making their products work in a client/server environment.

▲ **New skills and expertise and a new way of thinking about computing.** Organizations — both vendor and user — face the challenge of cultivating the skills needed to build a client/server computing infrastructure and develop the sophisticated applications that will run across that infrastructure. But perhaps more important, some companies will have to move beyond the current centralized approach to information processing. That can entail turf battles and political problems, as well as dealing with legitimate concerns about security and other issues.

▲ **More powerful networks offering bandwidth on demand.** In order to give end users immediate access to data and applications across a network, the network itself must be able to accomodate changing needs in a split second. Users need a new generation of internetworking products and services that can handle these demands.

Who is working on client/server today?

Virtually every company in the information technology industry has voiced commitment to the client/server concept. And they are working to provide the products and services needed to help that concept take shape.

Computer vendors like IBM, Digital Equipment Corp., Data General Corp., NCR Corp. and others are opening their proprietary architectures to enable their machines to work hand-in-hand with other devices in a distributed computing environment. They and others are also working to provide the integrated data, network and systems management tools needed to support operations in a client/server world.

Network product and services vendors like AT&T, MCI, US Sprint Communications Co., Wellfleet Communications, Inc., cisco Systems, Inc., Newbridge Networks, Inc., Timeplex and others are working to provide flexible networks that provide not only the necessary bandwidth but the reconfiguration and redundancy capabilities needed to support client/server.

Applications suppliers like Microsoft, Lotus Development Corp., Computer Associates, D&B Software, Borland and others are working to provide a new generation of applications that enable users to leverage client/server computing environments. In addition, systems software vendors are providing the software foundation and development tools to support distributed processing.

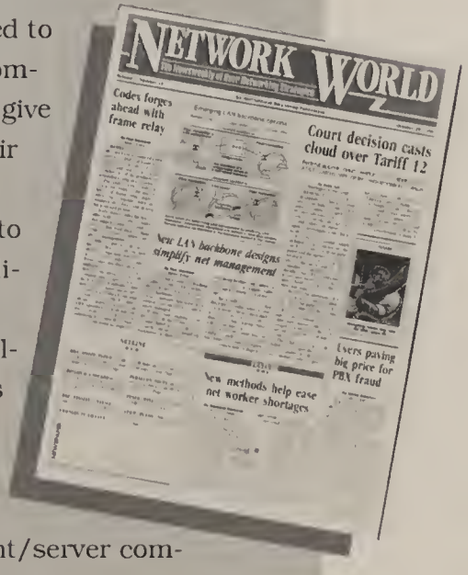
LAN vendors such as Novell, Microsoft, Ungermann-Bass and others are building on current offerings to support a greater number of end users, a wider array of desktop devices and access to information throughout a corporation.

Data base vendors like Oracle, Sybase, IBM, Computer Associates and others are continually enhancing their products to provide the real distributed data base capabilities required for client/server computing, as well as applications development tools.

The best coverage of client/server computing

The key to covering the emergence of client/server computing is to provide timely, insightful reporting on the major issues shaping the marketplace, as well as user concerns and triumphs.

Network World provides that total and unbiased coverage to more than 150,000 readers each week. And because *Network World* is not tied to any one technology or approach to computing, we are in the best position to give our readers excellent solutions to their corporate-wide information needs.



From LANs, to network services, to distributed DBMS, to networked applications, to internetworking, *Network World* reports on key technology developments, the obstacles keeping users from client/server computing as well as how leading user companies are making the move to client/server.

Networking is at the heart of client/server computing and *Network World* is a leading source of enterprise network information — from corporate backbone networks to departmental LANs.

The Newsweekly of Enterprise Networking Strategies

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Banyan adds Mac support, retools VINES

By Timothy O'Brien
West Coast Bureau Chief

DALLAS — Banyan Systems, Inc. last week announced a major upgrade to its VINES network operating system, including much needed support for Apple Computer, Inc. Macintoshes and new file and print services.

With the addition of Macintosh support in VINES 5.0, Macintosh users can gain access to VINES services and communicate with DOS, OS/2 and Microsoft Corp. Windows client workstations connected to a VINES server.

VINES 5.0 will also enable Macintosh users on an AppleTalk net to transfer data to another AppleTalk net via an Ethernet- or token ring-based VINES network.

At NetWorld 91 Dallas, Banyan hailed Version 5.0's arrival as significant because it provides a high level of Macintosh integration. Users and analysts, however, thought the software's impact was lessened due to Banyan's failure to include desired Unix client support.

"Since we plan on living with Banyan for a long time, support for Unix clients is very much an issue for us," said Eric Troup,

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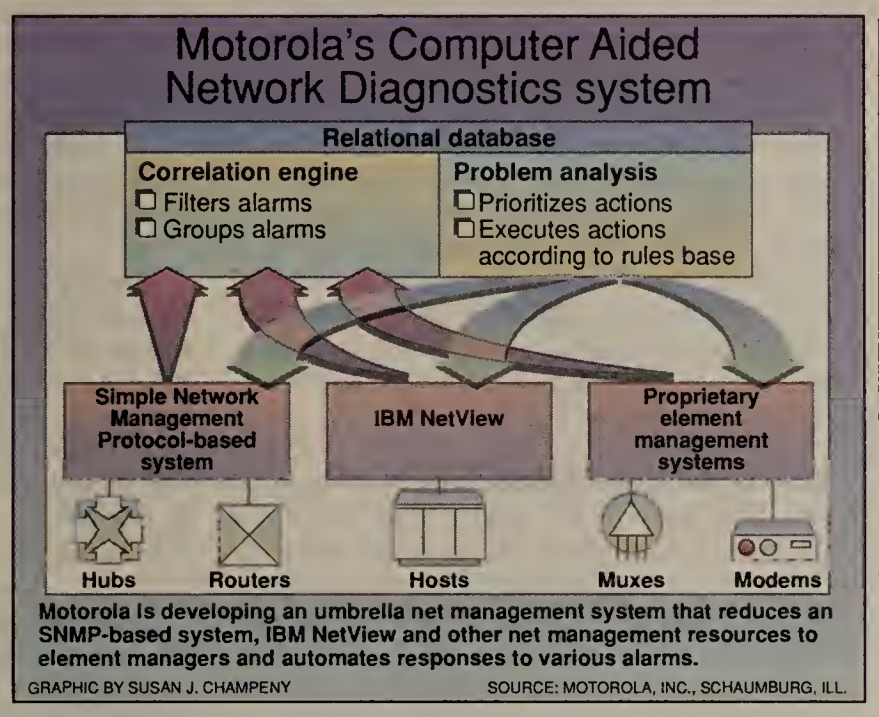

Motorola is developing an umbrella net management system that reduces an SNMP-based system, IBM NetView and other net management resources to element managers and automates responses to various alarms.

GRAPHIC BY SUSAN J. CHAMPENY | SOURCE: MOTOROLA, INC., SCHAUMBURG, ILL.

Motorola to build umbrella manager to oversee nets

By Bob Brown
Senior Editor

SCHAUMBURG, Ill. — Unimpressed with off-the-shelf solutions, a network design team for Motorola, Inc.'s communications product groups plans to begin building by year end its own umbrella network management system to oversee a worldwide LAN internetwork.

The Computer Aided Network Diagnostics (CAND) system will control Simple Network Management Protocol (SNMP), IBM's NetView and other element management systems. It will also include an expert system knowledge base that will automate responses to some alarms.

"The element managers out there are only as powerful as the person sitting in front of them," said Dan Simone, a network engineer for Motorola's Land Mobile Products Sector here.

Roy Gignac, a fellow engineer, added, "With the umbrella system, we hope to provide the sophistication to take away the need for a network engineer."

The design team developing CAND hopes the system will free

(continued on page 70)

Apple, IBM flesh out Mac, SNA integration

Vendors plan to let Mac operate as a peer node in SNA nets with access to a range of IBM systems.

By Caryn Gillooly
Senior Editor

DALLAS — Apple Computer, Inc. and IBM last week laid out a comprehensive blueprint designed to better integrate Macintosh systems as peer nodes into Systems Network Architecture nets supporting IBM's full range of processors.

The goal of the relationship is to provide Macintosh users with a more complete set of file- and print-sharing, database access, terminal-emulation and net management services than currently available.

IBM breaks into the fast growing multimedia market with a bang. See story, page 2.

"This [agreement] is not about marriage; it's about adding value," said Michael Spindler, Apple's president and chief operating officer.

Ellen Hancock, vice-president and general manager for networking systems at IBM, agreed. "What we're doing is recognizing, at the enterprise level, that the work group is an essential element of the overall network as well as [recognizing] the need for centralized [management] control," she said.

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INSIDE

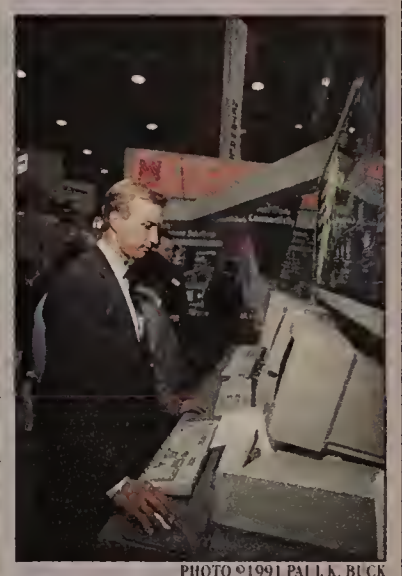

PHOTO ©1991 PAUL K. BUCK

NetWorld 91 Dallas hosts the arrival of new net wares. See coverage, page 4.

DECmcc pack to undergo Unix face-lift

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Bowing to user demands for a nonproprietary management platform, Digital Equipment Corp. plans to make good on an earlier promise by unveiling a Unix version of its DEC Management Control Center (DECmcc) Director net management software by the middle of next year.

DEC is also considering making an operating system-independent version of DECmcc Director available to other vendors through its Open Network Licensing (ONL) program. That could lead to the availability of DECmcc Director-based systems on a variety of hardware and operating environments.

Currently, Bell Atlantic Soft-

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NETLINE

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CABLE & WIRELESS launches 30-channel, 2.048M bit/sec E-1 service between seven U.S. cities. Page 4.

CRY FOR OVERSIGHT of the public network intensifies as FCC Commissioner Duggan adds his voice to the crowd. Page 4.

RED CROSS TO SAFEGUARD blood with network Band-Aid that spans the nation. Page 6.

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MCI SEES CRACKS FORMING in FTS 2000 and hopes to get in on the $25 billion contract. Page 6.

SUPERSERVERS LAID BARE in LAN Buyer's Guide. Page 41.

NEWSPAPER

NEWS FEATURE

Good virus protection comes cheap, test shows

By Salvatore Salamone
Features Writer

A dollar doesn't buy much these days, but it will buy the best virus removal product on the market, according to the first test in the *Network World*/National Computer Security Association (NCSA) Network Security Test Series.

NETWORK SECURITY TEST SERIES

With virus infections and other network security problems on the rise, *Network World* teamed up with NCSA, an independent organization that researches security, virus and data integrity problems, to help readers choose among the growing number of network security products.

In this premier trial, NCSA tested 11 antivirus software packages which, in theory, are designed to remove viruses and restore infected files to their original state. In practice, however, the test found

(continued on page 68)

LAN routers: economical, sure, but are they reliable?

Users wonder if internets based on routers can be trusted to support mission-critical applications.

By Maureen Molloy
Staff Writer

As users increasingly deploy routers to consolidate traffic from redundant backbones onto LAN internetworks, many are beginning to question whether the devices are capable of sustaining the high network reliability needed to support mission-critical data.

Although users are attracted to the economy of cutting over data from multiple networks onto a single local-area net internetwork, many are reluctant to do so because they say routers lack sufficient redundancy to ensure network availability.

"Fault tolerance is a key requirement because, in my current network design, if the router goes down, I'm in big trouble," said John Scoggin, supervisor of network operations at Delmarva Power & Light Co. in Wilmington, Del.

Peter Sevcik, a principal at Technology Management International, Inc., a consultancy in Cambridge, Mass., said the aggregation of large traffic loads into a single backbone router is a phenomenon that requires router vendors to boost the device's fault tolerance. Adding features such as redundant power supplies, multiple buses and modules that can be swapped out without

(continued on page 7)

IBM enters multimedia fray with line of PS/2 tools

Makes it possible to display TV images on screen.

By Joanne Cummings
Staff Writer

WHITE PLAINS, N.Y. — IBM last week announced a bevy of multimedia products, including a device that enables a Personal System/2 to act as a television, a connector for the PS/2 TV that lets computer, video and audio signals share LAN facilities, and a PS/2-based videoconferencing system.

According to analysts, the new product line, dubbed Ultimedia, is IBM's attempt to gain a foothold in the fast growing multimedia market.

"Apple, Microsoft [Corp.], IBM, Digital and Silicon Graphics [Inc.] have all looked at multimedia as having tremendous growth opportunities," explained Barbara Ellis, a senior analyst at MWA Consulting, a Palo Alto, Calif.-based consultancy that follows the electronic imaging market. "This is IBM's push to establish their stake in the market."

Among the many announcements was the IBM PS/2 TV, a stand-alone box that fits under the PS/2's monitor and is plugged into the keyboard, system unit and monitor. It lets people working at PS/2s watch or monitor video or television broadcasts received from cable companies, satellite dishes or antennas.

(continued on page 72)

Vendor coalition's API to aid imaging system users

By Joanne Cummings
Staff Writer

SAN JOSE, Calif. — A coalition of imaging vendors last week said it has developed an application program interface (API) that will make it easier for end users to retrieve images and incorporate them into their applications.

The coalition, which comprises nearly 100 hardware and application software vendors, is led by a working group consisting of Aldus Corp., Caere Corp., Eastman Kodak Co., Hewlett-Packard Co. and Logitech, Inc. The group believes its cooperative effort will spur growth in the imaging market by making it simpler for developers to build software applications that work with a variety of imaging systems.

The jointly developed API "provides the connectivity between devices and applications that will grow the market for all players," explained Pierluigi Zappacosta, president and chief executive officer of Logitech. "It will make computers more powerful and intuitive for users."

Known as the Connecting Link for Applications and Source Peripherals (CLASP), the API is designed for applications that run

(continued on page 70)

Briefs

Common OSI profile on schedule. Representatives of various Open Systems Interconnection groups last week set a timetable for releasing a common OSI profile, called the Industry and Government Open Systems Specification (IGOSS). IGOSS will define elements common to the Manufacturing Automation Protocol, the Technical Office Protocol, the Utility Communications Architecture and the Government OSI Profile.

According to Jerry Mulvenna, manager of the network applications group at the National Institute of Standards and Technology, IGOSS 1.0 will be released by next June. More than 95% of each of the separate profiles — such as GOSIP 3.0, which is scheduled for release this spring — will be included. The initial version will define a variety of application-layer protocols, such as electronic data interchange, directory services, remote database access and transaction processing.

Big Three post financials. Reporting results with NCR Corp. for the first time, AT&T last week posted a $1.8 billion loss for the third quarter ended Sept. 30. The sum of the companies' combined earnings in the same quarter last year was $803 million. AT&T took $4.2 billion in charges during the quarter to cover NCR merger costs and other items. Combined revenue for AT&T and NCR during the past quarter was $11.04 billion, up 1.2% from the same period last year.

MCI Communications Corp. reported third-quarter revenue of $2.148 billion, up 2.4% from $2.098 billion last year. Earnings for the quarter were $133 million compared to a loss of $176 million in the third quarter last year, when the carrier took a $550 million write-down for network modernization.

US Sprint Communications Co. reported $1.36 billion in third-quarter revenue, up 5.6% from $1.28 billion in the same quarter last year. US Sprint's revenue for the period was down slightly from second-quarter revenue of $1.36 billion. The carrier's operating income for the third quarter was $90 million, up 67% from earnings of $54 million in the third quarter last year.

AT&T equipment biz still losing. Robert Kavner, AT&T group executive for communications products and federal systems, last week said that the previously announced restructuring of AT&T's Business Communications Systems group and its Computer Systems unit's losses would account for $1.1 billion of the $4.2 billion in charges AT&T took against earnings during the third quarter. The restructuring is intended to improve the operations and distribution systems of its Business Communications Systems group and General Business Systems Group, which sell AT&T's premises-based switching systems.

"This business has been losing money — less each year for the last three years — yet it is not profitable today," Kavner said.

Timeplex lands U.K. net contract. Timeplex, Inc. last week announced it has been awarded a $5.5 million contract to build a packet-switched network for Nationwide Anglia Building Society, a U.K.-based bank. The network will include 760 Timepac NP100E packet switches supporting 760 Time/LAN 100 routers and will enable the bank to migrate its automated teller network onto its X.25 backbone.

LAN messaging work group to meet. The inaugural meeting of the Electronic Mail Association's (EMA) LAN Messaging Workgroup will be held Oct. 27 in New Orleans in conjunction with the EMA's eighth annual conference. Nina Burns, president of Network Marketing Solutions, a Menlo Park, Calif., consulting firm, is spearheading the formation of the work group. It will provide users and vendors with a forum for discussing local-area network messaging issues and will allow them to cooperate on developing LAN E-mail standards. Burns hopes to propose that the work group become a formal EMA committee during the first quarter of 1992.

AT&T laptop gets wireless E-mail. AT&T and Skytel Corp., a paging service provider, last week said they are teaming up to let users route AT&T Mail messages over Skytel's network to pagers equipped with an interface for Safari, a notebook-size personal computer. The pager can store up to 20 messages with 240 characters before loading them into Safari. The service is available now in the U.S. and Canada, and is scheduled for introduction in Mexico by year end.

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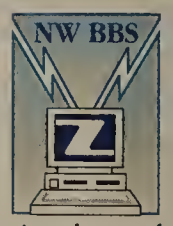

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GTE to offer 100M bit/sec digital local-loop service

Service will support LAN-to-LAN interconnection.

By Bob Wallace
Senior Editor

IRVING, Texas — GTE Telephone Operations last week became the first local exchange carrier to announce plans for a 100M bit/sec fiber optic-based service designed to support LAN-to-LAN interconnection and other high-bandwidth applications.

The Multi-Media Data Service (MMDS) will bundle the equipment and circuits needed to interconnect Ethernet and token-ring local-area networks, as well as support applications such as mainframe channel extension and point-to-point video.

MMDS will be supported by fiber-optic time-division multiplexers that GTE Telephone is deploying throughout its network and Fibermux Corp. Magnum100 multiplexers at customer premises.

Service bandwidth will be allocated in 6.25M bit/sec channels of which 4.7M bit/sec will be available for use. Users can amalgamate the capacity of as many as 16 channels.

GTE Telephone plans to begin offering MMDS here and across its networks in Honolulu, Los Angeles and Tampa, Fla., in 1992. The service will be deployed in other cities based on customer demand. The carrier currently provides local phone service in 40 states.

According to Gary Rider, a GTE Telephone network service product manager, MMDS is largely a response to Metropolitan Fiber Systems, Inc.'s (MFS) recent announcement of fiber-based services that support LAN-to-LAN interconnection at speeds up to 100M bit/sec.

"We're firing a warning shot over the bow of our [alternate access] competitors," Rider said. "We're going to fight to keep our customers, and this service is how

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We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication. Call (800) 622-1108 and ask for Ext. 487.

Sun teams with Novell to offer NetWare on Solaris

By Timothy O'Brien
West Coast Bureau Chief

DALLAS — SunConnect, a Sun Microsystems, Inc. business unit, joined Novell, Inc. at NetWorld 91 Dallas last week to announce NetWare SunLink, a version of NetWare ported to Sun's Unix-based Solaris operating system.

In addition to offering NetWare on the Sun platform, SunConnect will work with Novell to enable NetWare SunLink to provide Unix file and print services to NetWare-based DOS, OS/2, Microsoft Corp. Windows and Apple Computer, Inc. Macintosh clients.

By providing NetWare for its 32-bit Solaris 1.0 operating system, Sun is looking to enter the market for general-purpose local-area network servers and pit its high-performance SPARC servers against machines based on Intel Corp. microprocessors.

"This is the most significant networking announcement for Sun to date," said Eric Schmidt, president of Sun Technology Enterprises, Inc. "We hope to broaden the market for our servers and increase the acceptance of Unix within Novell's installed base."

According to Schmidt, this announcement builds on an existing relationship with Novell dating back to 1988, when Novell licensed the Network File System (NFS) from Sun to give Unix workstations access to NetWare servers.

"This product is now the solution for the other half of that problem — giving NetWare users connectivity into Unix," he said.

Analysts said this union was inevitable. "Sun, already the leader in Unix workstations, stands to gain now in its server business with help from Novell's momentum in the market," said Martin Palka, senior industry analyst with Dataquest, Inc., a market research firm in San Jose, Calif.

"It's not an earth-shattering announcement, but it's a good move on Sun's part," added Jamie Lewis, editor of the "Clarke Burton Report," a network indus-

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Infonet struggling in the one-stop shopping mart

Carrier's owners may become biggest rivals.

By Barton Crockett
Senior Editor

EL SEGUNDO, Calif. — Infonet Services Corp. is struggling to keep its carrier owners from becoming its biggest rivals in the form of carrier consortiums created to offer one-stop shopping for global network services.

In an interview with *Network World* last week, Jose Collazo, chairman and president of Infonet, based here, said the company and the 11 carriers that own it are struggling to find better ways to cooperate in the emerging market for one-stop shopping services.

Analysts believe that the demand for these services will grow rapidly as business becomes more global and restrictions on resale of private-line capacity fall.

Many carriers are trying to address the market by joining consortiums with carriers from other countries. The highest profile consortium is spearheaded by British Telecommunications PLC, which last month created a company called Syncordia Corp. in Atlanta, Ga., to offer end-to-end global network services.

Syncordia troubles Infonet because the consortium is trying to sign up, among other carriers, Deutsche Bundesposte (DBP) Telekom, one of Infonet's biggest owners.

Infonet not only wants its owners to stay away from rival consortiums, it wants to keep them from unilaterally selling outsourcing services in competition with Infonet. "We're rethinking our future and how we can, in the broader sense, compete against these supposedly global carriers," Collazo said.

If DBP Telekom joins Syncordia, it would be a major blow to Infonet since DBP Telekom owns 16% of the value-added service provider. The carrier's stake in Infonet is equalled only by France Telecom and exceeded only by MCI Communications Corp., which owns 25% of Infonet.

Collazo said he would prefer

(continued on page 74)

FCC official backs creation of unit to probe outages

Duggan says FCC should ensure net reliability.

By Anita Taff
Washington Bureau Chief

ORLANDO, Fla. — FCC Commissioner Ervin Duggan last week renewed calls for the agency to take a more active role in ensuring the reliability of the public network, including the establishment of a task force to investigate network outages.

In a speech at the Competitive Telecommunications Association's fall conference here last week, Duggan added his voice to those of users and lawmakers who are clamoring for better network oversight from the FCC.

"At present, the Federal Communications Commission is only anecdotally aware of threats to network reliability," Duggan told attendees. "We need to educate ourselves systematically with an eye toward identifying significant sources of vulnerability — from hardware and software problems to sabotage and hacking."

Fears about the vulnerability of the public network have grown in the wake of a string of nine major outages in the last year and a half that left millions of businesses and residential customers without telephone service.

But even before these recent outages, Duggan had expressed doubts about the FCC's ability to cope with network problems.

In February, he sent an internal memo to FCC Chairman Alfred Sikes asking that the agency begin a comprehensive study into the vulnerability of the net. The memo also called for the creation of an investigative body much like the National Transportation Safety Board (NTSB), which investigates airline accidents.

To date, the FCC has responded to public concerns about network reliability by instituting a requirement that carriers report outages. For any failure affecting more than 50,000 customers, the carriers must report to the FCC within 90 minutes, providing details on the cause, extent and expected duration of the outage.

Last month, the FCC convened a group of about 30 people representing a cross section of the industry in a closed-door meeting to discuss better ways to share information about outages as well as test technology before it goes into the network.

Some lawmakers say the FCC's oversight of the network has been pitifully inadequate.

In hearings last month, representatives on the House Telecommunications Subcommittee pressed the FCC to set national network quality standards ("Lawmakers call for quality standards in public nets," *NW,* Oct. 7).

While Duggan stopped short of calling for network standards, he agreed more action is needed from the FCC. "The FCC needs to remedy the fact that it has virtually no formal institutional machinery for investigating network calamities," Duggan said.

Duggan suggested that the FCC move immediately to conduct a formal comprehensive study of the network in an attempt to pinpoint potential areas of weakness.

In addition, Duggan said the FCC must coordinate efforts to

(continued on page 65)

Cable & Wireless division brings E-1 service to U.S.

By Bob Wallace
Senior Editor

VIENNA, Va. — Cable & Wireless Communications, Inc. last week introduced the first U.S. E-1 service, which offers users 25% more bandwidth than T-1 service.

E-1 service, which is used extensively in Europe for private backbone networks, runs at 2.048M bit/sec and supports 30 64K bit/sec channels. By comparison, T-1 runs at 1.544M bit/sec and supports 24 64K bit/sec channels.

Analysts said E-1 service, which provides an intermediate rate between T-1 and 45M bit/sec T-3 services, will be used to support applications such as local-area network interconnection, imaging and computer-aided design and manufacturing.

"Cable & Wireless is making E-1 available in major U.S. cities around the country to meet user demand for domestic extensions of international circuits, as well as for U.S. applications requiring high-capacity clear-channel bandwidth," said Charles Gibney, the company's senior vice-president of sales.

Clear-channel capability increases from 56K to 64K bit/sec the amount of channel bandwidth available to customers of T-1, E-1 and other data services.

Cable & Wireless Communications offers the service between seven cities: Boston, Chicago, Los Angeles, New York, Portland, Ore., San Francisco and Washing-

(continued on page 65)

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Red Cross plans backbone net to link regional sites

By Joanne Cummings
Staff Writer

WASHINGTON, D.C. — As part of an effort to eliminate safety flaws in its blood processing system, the American Red Cross last week announced plans to build a backbone network to link its 52 Blood Service centers nationwide.

The network, which will link currently isolated and autonomous Blood Service sites, will enable the Red Cross to better standardize blood processing procedures, provide nationwide automation of blood testing and centralize donor data.

With an estimated cost of about $40 million, the network "will be a dramatic leap forward in applying modern computer technology to blood processing," said Elizabeth Dole, president of the Red Cross.

Originally, the Red Cross planned to upgrade computers at the regional sites and provide them with common software for blood testing. That effort was prompted by the Food and Drug Administration, which charged the organization with safety violations last year. But the Red Cross decided to go a step further and implement the network and centralize data to accommodate its future needs, Dole said.

Scheduled to come on-line in 1994, the network will link computers at each Blood Service site. Currently, each site contains a hodgepodge of computers, most of which are approximately 10 years old, said Elizabeth Hall, a spokeswoman for the Red Cross. The organization has not yet decided what type of computers will be installed at the regional sites.

Today, those sites work primarily independently. They each use either mainframes or minicomputers to store donor information, automate blood processing, operate checks and controls to ensure that all blood products meet quality levels, and control the inventory and distribution of blood products.

Hall said the network will provide a means for linking the centers and standardizing these procedures as well as deliver a host of other benefits.

For example, computer processing and testing will reduce human error, she said. In addition, all 52 centers will be performing tasks in the same manner, so new blood processing techniques will be able to be adopted faster and more efficiently than current procedures allow, she added.

The network will also enable the organization to develop a nationwide blood inventory and dis-

(continued on page 74)

DG, Unisys redefine server lines with low-end models

Devices offer more power, memory, reliability.

By Joanne Cummings
Staff Writer

Data General Corp. and Unisys Corp. last week separately unveiled new low-end models for their respective Unix server lines that provide high performance for small work groups.

Both companies' offerings are slightly more expensive than their bottom-line server models, but the new models offer more memory, faster processing and higher reliability for small work groups, the companies said.

DG announced two 25-MHz Reduced Instruction Set Computer Motorola, Inc. 88100 microprocessor-based models — one a dual-processor server — while Unisys introduced a 33-MHz Intel Corp. 80486-based unit that comes bundled with the company's on-line transaction processing (OLTP) software.

AViiON calling

DG added two server models to its AViiON line of Unix servers — the AV 4300 and AV 4320. The new models fall between the company's AV 4100, which supports just 16M bytes of memory, and AV 4600, which supports 32M bytes.

The AV 4300 is a uniprocessor model based on a 25-MHz 88000 chip. It supports 16M bytes of memory, upgradable to 128M bytes in 8M- or 32M-byte increments, and has a disk capacity ranging from 332M to 8.4G bytes.

DG said the new servers are designed primarily as multiuser time-sharing systems that can support applications such as graphical information systems, office automation and retail distribution.

The AV 4300 runs DG's DG/UX version of Unix System V Release 4 and delivers 29 million instructions per second (MIPS) of performance. It comes with an Ethernet board with drivers for Novell, Inc.'s NetWare, Apple Computer, Inc.'s AppleTalk, Digital Equipment Corp.'s DECnet

(continued on page 72)

Net allows cellular callers to go beyond home region

By Barton Crockett
Senior Editor

KIRKLAND, Wash. — Foreshadowing the future of wireless communications, McCaw Cellular Communications, Inc. last week cut over a nationwide network that helps cellular telephone users originate and receive calls outside their home region.

The new North American Cellular Network is the largest net in the country that automatically routes calls between cellular telephone systems in different areas, according to Jordan Roderick, executive vice-president of Cellular One, a New York-based cellular telephone service provider controlled by McCaw.

Roderick said that while other networks link cellular systems within a single state or region, McCaw's North American Cellular Network is the first net that links cellular systems around the country.

"We have created a single intelligent network among our switches," Roderick said.

McCaw is the largest cellular telephone operator in the country.

Across the country

The North American Cellular Network links McCaw cellular telephone switches in New York, New Jersey, Pennsylvania, Florida, California, Nevada, Oregon and Washington into redundant, ring topology networks based on 56K bit/sec private lines from AT&T. The switching net is used to route information on the location of particular users among the various cellular switches.

This enables the switches to automatically route calls to users outside their home region. But rather than traversing the 56K bit/sec network — which is strictly used by the cellular switches to pass user data — long-distance calls are routed from the local McCaw switch to AT&T's public switched telephone network and then to the McCaw switch closest to the user.

Previously, callers had to dial inconvenient access codes to reach cellular users outside their home region. Alternatively, users could preprogram their cellular phones to accept calls from other regions.

MCI plans to move in on FTS 2000

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — As the government readies for FTS 2000 price renegotiations and tries to remedy management problems that threaten the contract, MCI Communications Corp. is laying plans to steal some of the federal network business from rivals AT&T and US Sprint Communications Co.

MCI claims that patience is wearing thin among lawmakers, who may withdraw their support for a provision that forces agencies to purchase service under the Federal Telecommunications System 2000 deal if problems are not resolved soon.

"The indications are that the concept of FTS 2000 seems to be waning," said Jerry Edgerton, vice-president of government systems at MCI.

As proof that the tide is turning, Edgerton pointed to a hearing scheduled for this week before the Senate Committee on Governmental Affairs. At the hearing, issues relating to FTS 2000, such as pricing and mandatory use, will be explored. He also cited a report issued by the General Accounting Office (GAO) last month that painted a damning picture of overcharges and mismanagement of the FTS 2000 contract.

One of the most troubling findings of the report was that the government has been paying rates as much as 50% higher than those paid by commercial users for the same services. The GAO projected that the government will be overcharged $148 million over the next two years.

The FTS 2000 contract has a provision that requires rates for the government's switched voice service to remain equal to or below commercial rates. Critics charge that the provision has not been properly enforced.

MCI, which bid on the FTS 2000 deal and lost to rivals AT&T and US Sprint, filed a tariff in February for a service that it claims is 40% less expensive than FTS 2000 offerings. FTS 2000 rates have come down since then, but MCI still claims its prices are 25% lower. The GAO said FTS 2000 prices for switched voice are 20% higher than commercially available rates.

In an interview last week, Edgerton said he is skeptical that the General Services Administration will be able to bring prices down sufficiently during the rebid required by the contract next year.

Edgerton pointed out that the

(continued on page 74)

GTE to offer 100M service

continued from page 4

we're going to do that."

MMDS, which is based on circuit-switching technology, differs from MFS' MetroFiber Multi-Megabit Data Service (MDS), which is based on packet switching.

With MMDS, customers lease capacity on a point-to-point basis and use the link as needed, Rider said.

MFS uses bridges and routers to support LAN interconnection services and offers bandwidth-on-demand services. MFS declined to quote prices for MDS, saying cost is determined on a user-by-user basis.

Rider said GTE Telephone "expects strong user demand for MMDS as users develop the need to interconnect LANs within a metropolitan area. MMDS offers users an alternative to throttling down native LAN speeds to T-1."

GTE Telephone will first offer MMDS in North Carolina.

Prospective customers for the service include business parks and corporations with multiple facilities in a single metropolitan area.

"MMDS is a natural fit for government users, biomedical companies and telecommunications equipment manufacturers [with high-bandwidth applications]" Rider said.

"Before MMDS, the only real alternative to support native data speeds between facilities in [a metropolitan-area network] was to install fiber-optic cable or to use microwave — both of which are costly.

"The cost of MMDS is less than DS3 and offers more flexibility and bandwidth," Rider said.

The Fibermux Magnum100 multiplexers at customers sites each house 16 I/O modules that plug into the backplane of the multiplexer. Two chassis can be combined to double that figure. Each I/O module supports one to 16 ports and can support speeds of 1.544M to 16M bit/sec.

Users will pay $600 a month per circuit end for the electronics used to provide the service, $135 a month per quarter mile for the fiber route and $120 a month for each interface module, Rider said. There is no charge for the incremental bandwidth.

Correction: In the story "Crescendo to deliver FDDI over copper" (*NW*, Sept. 30), the unit for measuring radiated electrical emissions was stated incorrectly. The Federal Communications Commission limits radiated emissions that occur above the 30-MHz band.

LAN routers: Are they reliable?

continued from page 2

shutting down the device minimizes the risk of having the router represent a single point of failure.

"When a large user has one-third of its corporate data running through a single router, that device better be reliable," Sevcik said. Vendors will need to satisfy this user requirement in their next generation of high-end routers, he added.

Nick Lippis, a principal at Northeast Consulting Resources, Inc., said router reliability has become key as internetworks are increasingly being used by large companies as a utility to support critical business applications. Previously, internetworks were built to tie LANs to relatively simple data such as file transfers and electronic mail.

But as companies merge Systems Network Architecture terminal traffic, transaction-oriented data and other forms of information across the internetwork, the router must become more reliable, he said.

"Internetworking is popular because it encourages diversity and enables users to connect many different types of systems," Lippis said. "But the key drawback, especially for users who are relying on the internet as a production tool, is most routers do not address the need for fault tolerance."

Addressing reliability

Wellfleet Communications, Inc. recently addressed the reliability criticisms of router-based internetworks with the introduction of its next-generation Backbone Node router ("Wellfleet offers up gigabit-speed router," *NW*, Sept. 9).

For the Backbone Node, Wellfleet replaced its existing VMEbus with a Parallel Packet Express (PPX), a backplane comprising four 256M bit/sec data channels with an aggregate throughput of 1G bit/sec.

Wellfleet's PPX addresses the reliability issue by offering load sharing across four data paths and provides fault tolerance by making it possible to automatically redistribute traffic across available channels in the event of a data path failure.

The Backbone Node also comes with redundant power supplies for added fault tolerance.

Scott Bradner, a senior technical consultant at Harvard University in Cambridge, Mass., said the Backbone Node's ability to hot-swap and dynamically reconfigure the router without shutting down the network will be key to users that cannot afford network downtime. No other router on the market today provides sufficient reliability, he said.

According to Lippis, other high-end routers that would typically be used as a corporate backbone router — such as Cisco Systems, Inc.'s AGS+ and Proteon, Inc.'s CNX 500 — lack sufficient redundancy features and could represent a single point of failure.

Bruce Byrd, a product line manager at Cisco, said the company will provide added fault tolerance in future product releases.

Lippis added, "Cisco and Proteon both have high-performance buses and support a wide range of protocols, but their major weakness is the lack of a highly reliable hardware platform. They'll need an architectural change to support all the mission-critical applications coming into their boxes."

But users will pay a premium for a high-performance, highly reliable router. A fully configured Wellfleet Backbone Node, for instance, costs almost $300,000. Some users insist the cost is justified, while others do not.

Art King, senior operating systems specialist at Pacific Power and Light in Portland, Ore., said he has not yet cost-justified the need for more robust redundancy in his network.

"How much redundancy you want is a factor of criticality and the amount of money you're willing to throw at the problem," King said. "Although we have a growing number of critical applications running over the internetwork, our routers have been running well, and we don't feel it's warranted yet to add greater fault tolerance."

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Legent Corp., the Vienna, Va.-based maker of NetSpy and other network monitoring tools, recently announced plans to merge with Spectrum Concepts, Inc., a New York-based company that provides LU 6.2-based file transfer software. The merger is expected to be completed by year end.

People & Positions

Rolm Co., a Norwalk, Conn., telecommunications equipment firm, last week named **Les Lesniak** senior vice-president of marketing.

The announcement was made as part of a sales and marketing organizational realignment within Rolm.

In his new position, Lesniak will have overall responsibility for Rolm's marketing activities. He replaces James Long, who left that position several months ago.

Previously, Lesniak was senior vice-president of sales for Rolm. His responsibilities for that position will be taken over by **Mitchell Watson Jr.,** Rolm's president and chief executive officer. A replacement for Lesniak may be sought, but no determination has been made on that yet, a company spokeswoman said.

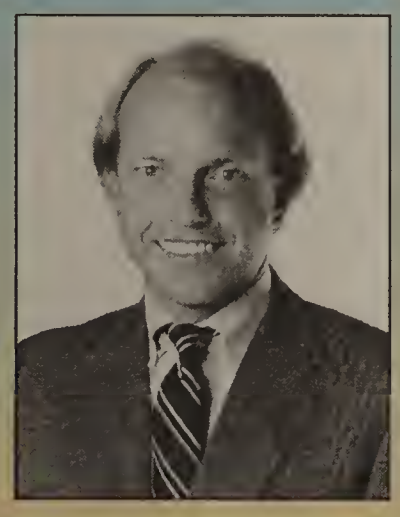
As part of a restructuring of its marketing organization, Rolm recently named four new product management directors.

James Beane was named director of strategy and new business development. He will be responsible for product strategy, new business development and competitive analysis. Previously, he was Rolm's director of product marketing and requirements for the integrated office.

(continued on page 12)

"We all know a lot more now about [the superserver] market than we did two years ago."

Jeff Hudson
Vice-president of sales and marketing
NetFRAME Systems, Inc.



Superserver mart facing a long, hard road ahead

Although market is still growing, obstacles loom.

By Bob Brown
Senior Editor

Expectations for the superserver market have shifted downward since the first major products began rolling out two years ago amid a wave of hoopla, industry observers said last week.

Although the market for the powerful multiprocessor superservers is still expected to double this year compared to last, and vendors are reporting strong demand for their products, analysts now say superservers will remain a niche market for some time to come.

The well-funded start-ups that spurred high hopes for the market have faced more obstacles than expected and one highly touted start-up — Parallan Computer, Inc. — even acknowledged a recent work force reduction.

Meanwhile, a slower than expected start for superserver suppliers gave general-purpose computer makers such as IBM time to gain ground by souping up existing systems to compete with superservers.

"Three or four years ago, when [the superserver vendors] laid out their business plans, it looked like a surefire win in the marketplace," said Doug Crook, senior industry analyst for Dataquest, Inc., a San Jose, Calif., market research firm. "But the market isn't unfolding the way they thought it would."

Lee Doyle, director of local-area network research at International Data Corp. (IDC), a Framingham, Mass., market research firm, agreed.

"This is a solid niche market, but it won't be a billion-dollar market anytime soon," Doyle said. The superserver market will grow from 7,000 units shipped in 1990 to about 14,000 units shipped this year, he added.

Parallan sent up a warning signal in the superserver market when it cut its work force last month, reassigned some employees to new jobs and curtailed plans to branch out from its core server business. Sources said the company cut its work force in half, but Parallan declined to comment on this.

Industry observers said Parallan's allegiance to OS/2 and LAN Manager, which have gotten off to slow starts, as well as its decision to establish a direct sales force have likely been major contributors to the company's shakeup.

However, according to Davis Fields, Parallan's director of marketing, the changes made by the company were mainly the result of the tight economy and the attendant delay in equipment purchases by large users.

Fields said he is confident that demand for the company's servers, which include a new generation of products unveiled last month, will pick up.

Not up to expectations

Officials at other superserver start-ups, including NetFRAME Systems, Inc. and Tricord Systems, Inc., also report strong demand.

But they acknowledge that the superserver market has turned out differently than nearly everyone expected it would when Compaq Computer Corp. and NetFRAME rolled out two of the first major superserver products in the fall of 1989.

"If some of the other players had positioned themselves better, maybe [the superserver start-ups] would have satisfied the market researchers' projections," said Larry Ingwersen, co-chairman and founder of Tricord. "Some of their product strategies have been off."

Jeff Hudson, NetFRAME's vice-president of sales and marketing,

(continued on page 13)

Carriers teaming up to offer global ISDN

Firms are joining forces worldwide to overcome technical differences in their switching systems.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — Driven by customer demand for global ISDN, carriers across the world have slowly begun to hammer out cooperative agreements to offer end-to-end Basic Rate Interface (BRI) service to users.

AT&T, Kokusai Denshin Denwa Company, Ltd. (KDD), Nippon Telephone and Telegraph Corp. (NTT) and Pacific Bell have combined forces to bridge the technical differences in their switching systems and share customer information to provide international Integrated Services Digital Network service to a handful of large multinational users.

According to AT&T and Pacific Bell representatives, similar deals are in the works with other carriers in the U.S. and abroad to satisfy a growing corporate demand for ISDN connectivity over the public switched network.

Before the four carriers signed a memo of understanding 10 months ago, both NTT and Pacific Bell faced pressure from Japanese companies with California locations that were clamoring for BRI links to support international dial-up transmission services for fascimile and data.

Jim Grivich, ISDN project manager at Pacific Bell, said the incompatibilities between the carriers' ISDN offerings required close cooperation to achieve global connectivity.

"In today's environment, you need to work very closely with the local company — whether it be Pacific Bell or NTT in Japan — and the carrier in between," Grivich said.

Because Pacific Bell has not fully deployed Signaling System 7, the carrier can only provide 56K bit/sec switched digital links as compared to NTT's full 64K bit/sec bandwidth. Part of the agreement reached in the memo established the need to install a rate adapter at Pacific Bell central offices.

But the memo also establishes procedures for handling technical problems and customer complaints. In addition, it sets up administrative procedures for

(continued on page 12)

INDUSTRY BRIEFS

Novell to boost Unix support. Novell, Inc. and Unix System Laboratories, Inc. (USL), developer of the Unix System V operating system, last week said they will form a joint venture to develop and market products and services to enhance NetWare and Unix System V Release 4 interoperability.

According to a memorandum signed by the companies on Oct. 8, Novell and USL have agreed to make available sales, marketing and distribution resources for the joint venture's products. Both will fund and staff the new company, which has not yet been named.

The companies are proceeding with negotiation of a definitive agreement and hope to reach one within two months. Novell owns a share of USL, which was spun off as a separate company by AT&T earlier this year.

IBM posts drops in revenue, earnings. IBM last week reported revenue of $14.4 billion for the third quarter ended Sept. 30, down 5.5% from $15.3 billion in revenue for the third quarter last year. Earnings for the quarter were $172 million, down 84.5% from earnings of $1.1 billion for the same quarter last year.

"While our third-quarter business performance continued to be affected by weak global economies, competitive pressures and product transitions, we are encouraged by demand for our recently announced products," said IBM Chairman John Akers. "We have made steady progress in our ongoing restructuring efforts, and we now expect to reduce our worldwide work force by more than 20,000 employees this year."

(continued on page 13)

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Carriers teaming up to offer global ISDN

continued from page 9

sharing customer billing and application information.

AT&T, the long-haul carrier of the group, took on the role of ambassador to bring the other carriers together. "We are trying to become a catalyst to make it happen with service providers in the U.S. and Asia," said Jerry Nowicki, sales director at AT&T Network Systems.

The Tokyo-San Francisco connection was a natural first step since there are about 800 NTT customers in California, Nowicki pointed out. Countries where BRI is available, and large corporations have offices, are natural points of focus for carriers that are concerned about market demand (see graphic, this page).

"By 1995, there will be about 4.5 million ISDN lines in the world," Nowicki said. "The question is, how do we connect them locally?"

The answer is cooperative agreements. "We need to think about logical partnerships where each partner is concerned about the well-being of the other," he said.

At Ricoh Company, Ltd. and Fujitsu, Ltd., which are manufacturers of ISDN equipment and, not surprisingly, big boosters and early users of the technology, the payoff in carrier cooperation has translated into lower transmission costs.

Dan Freedman, sales manager at Ricoh, said his company uses BRI ISDN nationally from its locations in Chicago, New Jersey and the San Francisco Bay Area. With the carrier memo of understanding in place, Ricoh's California locations in San Jose and Orange County can send high-resolution Group 4 facsimile to Tokyo at higher speeds and lower costs than Group 3 fax.

With Group 4 fax, which requires use of 64K bit/sec links, 1,000 pages can be transmitted in one hour for 1 cent per page, while the same number of pages takes eight hours to transmit at 9.6K bit/sec and costs 5 cents per page with standard Group 3 fax.

However, the lack of ubiquitousness and the wide swing in ISDN rates around the world are a source of frustration for both vendors and users.

Nowicki said there are only half a dozen states with BRI tariffs. And Freedman pointed out, "You can't get the Baby Bells to offer the same rates." He also called the lack of ISDN availability in Hong Kong "a big stumbling block. You can't have a worldwide network without Hong Kong."

But global connectivity may improve soon. Grivich said Pacific Bell is conducting discussions with MCI Communications Corp., US Sprint Communications Co., Cable & Wireless PLC, and post, telegraph and telephone administrations in Australia, France and Norway to create memos of understanding similar to the Japan agreement. AT&T is talking with several of the regional Bell holding companies and foreign PTTs with the same end in mind.

Nowicki said the carriers need to dispel the user perception that ISDN is "a great technology with no place to go. We're trying to destroy that myth."

International Basic Rate Interface profile

Country	Number of top 1,000 global companies	ISDN tariffs (per line)	Thousands of lines		
			Current	1992	1995
U.S.	359	$30 to $50	220	300	2,100
Japan	309	$70	50	100	1,000
U.K.	94	$50 plus features	0.5	10	100
France	40	$55	9	100	700
Germany	39	$46	10	100	250
Italy	19	None filed	Pilot stage	3	NA
Sweden	17	None filed	Pilot stage	NA	NA
Netherlands	13	None filed	Pilot stage	NA	NA
Spain	13	None filed	0.5	NA	NA
Switzerland	11	Tariff pending	0.51	NA	NA
Belgium	10	Tariff pending	NA	NA	NA
Finland	6	None filed	Pilot stage	NA	NA

NA = Not available

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: AT&T, BASKING RIDGE, N.J.

People & Positions

continued from page 9

Bernhard Fliedner was named Rolm's director of systems, responsible for new products supporting Integrated Services Digital Network and other technologies, systems integration and service planning. Previously, he was director of brand management for ISDN and networks.

James Mackey was named director of applications, with responsibility for call centers, PhoneMail, integrated messaging and Rolm business partners. Formerly, he was director of product marketing and requirements for call center applications.

Rose Rambo was named director of operations, responsible for the product launch project of office and future 9005 software releases for Rolm's 9750 Business Communications System. Previously, she was brand manager for Rolm's CBX products.

Superserver mart facing long road

continued from page 9

said his company has gone through a major education process during the past two years, as have its existing and potential customers. "We all know a lot more now about this market than we did two years ago," he said.

Lessons learned

For one thing, superserver vendors focused much of their initial sales effort on users involved in downsizing projects, a market that didn't grow as fast as expected, said IDC's Doyle. A bigger opportunity for the vendors was in the upsizing arena in which users were consolidating smaller LANs.

But even there, the vendors faced a challenge, Doyle said. A superserver's price often exceeded the sign-off authority of managers in those sites, and the superserver suppliers were going up against established competitors.

"The user is faced with the choice of buying $20,000 PCs from his current supplier or a $40,000 superserver from a new company," Doyle said. "That's a tough sell for the superserver vendor."

Larry Stouder, manager of technical development at Continental Grain Co. in New York, agreed.

"Superserver vendors have really changed the rules of the game, and that takes a while for users to adjust to," said Stouder, whose company has installed several Compaq SystemPro superservers. "You're looking at putting more [applications] on one server, so you have single-point-of-failure considerations. Also, the expenditure level is ratcheted up to another level and that may require different levels of administrative approval."

In addition, traditional hardware suppliers like IBM and Sun Microsystems, Inc. have made technology gains on the superserver makers over the past couple of years, Dataquest's Crook said.

Many users feel their existing computer vendors have a compelling argument when they recommend their products over equipment made by a start-up, Crook explained.

Also, the general-purpose computer makers have scared off some potential superserver users by referring to the superservers as "appliances" that will only have a few years of usefulness, he said.

"A user buying a server has fear, uncertainty and doubt in the forefront of his mind," Crook said. "There are questions of compatibility with the installed base and support. The general-purpose computer makers are hitting hard on these issues."

There is no doubt that the superserver vendors are selling technically superior products compared to the souped-up versions of some general-purpose computer makers' products, Crook said.

The problem for the superserver makers "is that the marketplace is more market-driven than technology-driven," Crook said.

Superserver optimists, however, said faster growth may be on the horizon as superserver vendors take steps to adjust to market conditions.

For example, Tricord earlier this year bolstered its research and development resources via a new relationship with a large Japanese firm and has been busy establishing distribution channels. Both Parallan and NetFRAME, meanwhile, have recently introduced more affordable versions of their servers.

"We're starting to see the demand for these products we thought we'd be seeing 18 months to a year ago," said Luther Nussbaum, chairman and chief executive officer at Evernet Systems, Inc., a Los Angeles network integration firm that resells Compaq SystemPros and NetFRAME superservers.

Industry Briefs

continued from page 9

SynOptics has revenue gain. SynOptics Communications, Inc. last week reported revenue of $59.2 million for its third fiscal quarter ended Sept. 27, up 22.5% from revenue of $48.4 million in the third quarter last year.

In addition, revenue for the quarter fell 7.6% from $64.1 million in the previous quarter. Also, net income for the third quarter fell to $4.3 million from $8.2 million in the third quarter last year — about a 48% drop.

The decline in revenue from the second quarter was partly the result of a sluggish economy and various competitive pressures, according to Andrew Ludwick, president and chief executive officer at SynOptics.

A reduction in the price of certain products during the third quarter, along with a shift in product mix and expenses, negatively affected the bottom line, Ludwick explained.

"It is important to support the company's long-term direction while at the same time making the adjustments necessary to address near-term issues," he said.

EDS named Compaq reseller. Compaq Computer Corp. last week named Electronic Data Systems Corp. (EDS) as its first Authorized Worldwide Systems Integrator.

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Co-Processor	Optional 80387SX	Weitek 4167 socket i486DX upgrade	Weitek 4167 socket	Weitek 4167 socket	Optional 80387SX
Memory (Std./Board Max.)	2MB/16MB	4MB/32MB	4MB/64MB	8MB/64MB	1MB/8MB
Expansion Slots	4 open 16-bit ISA	3 open 32-bit EISA	3 open 32-bit EISA	8 open 32-bit EISA	2 open 16-bit ISA
Hard Disk Drive	40MB or 80MB IDE	80MB or 200MB IDE	200MB or 400MB IDE	340MB half-height SCSI; 6 open half-height bays	Diskless; 40MB IDE optional
Ports	2 serial, 1 parallel	2 serial, 1 parallel	2 serial, 1 parallel	2 serial, 2 parallel, 1 mouse	2 serial, 1 parallel
Disk Drive Controller	Combined IDE connector/ floppy controller	Combined IDE connector/ floppy controller	Combined IDE connector/SCSI/ floppy controller	EISA bus master SCSI mass host adapter	IDE connector/ floppy controller
Video	16-bit VGA card	16-bit VGA card	TIGA/VGA	16-bit VGA card	16-bit VGA on board
LAN Features				Optional RAID 5 disk array software	Dual level ROM-based password protection

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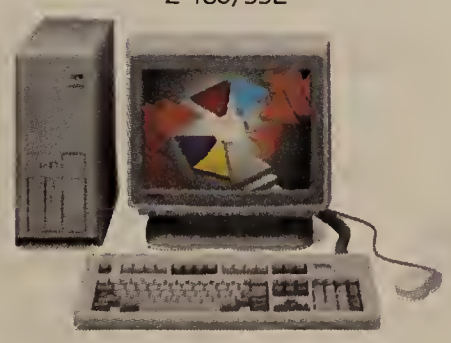

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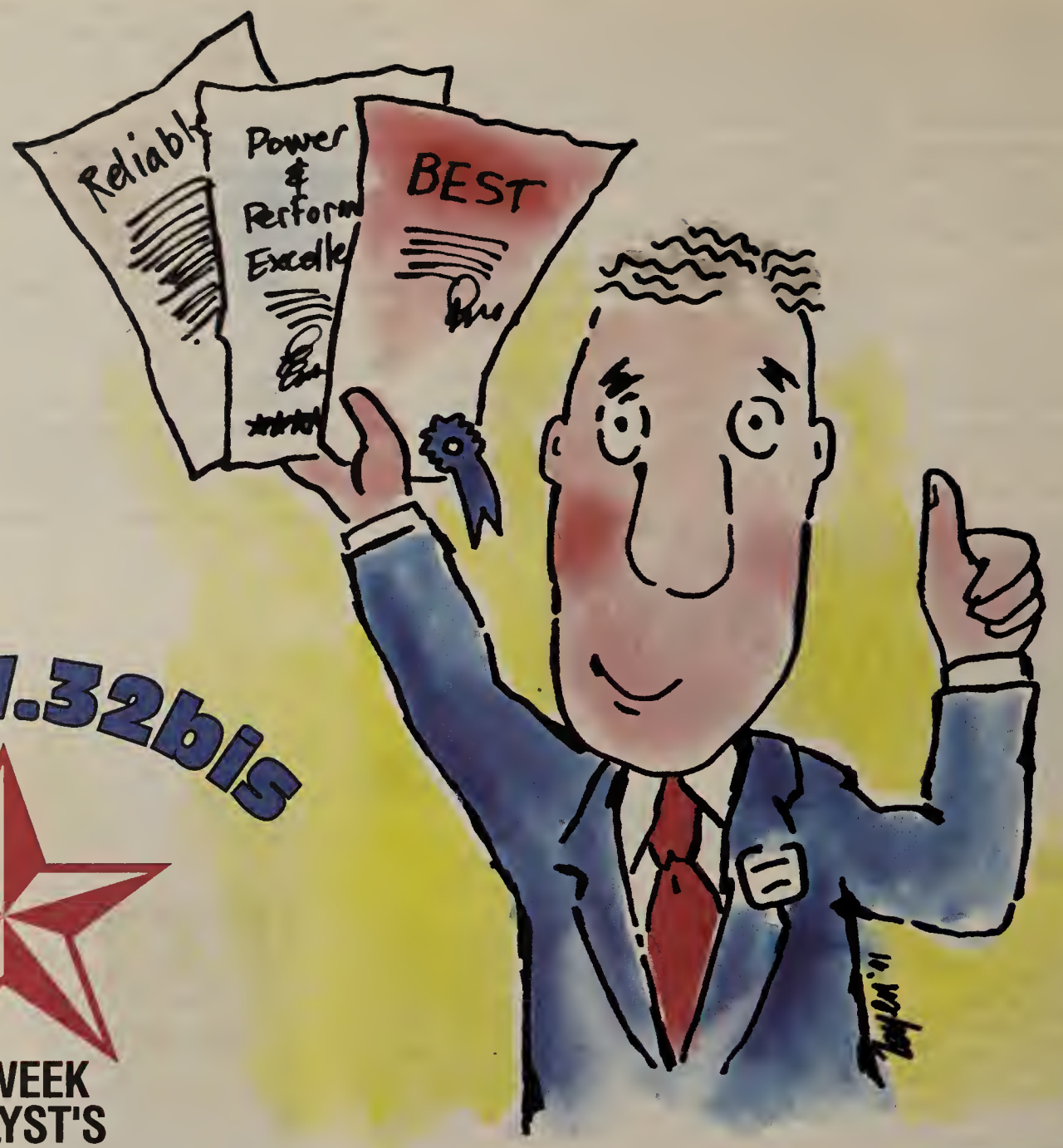

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PC WEEK ANALYST'S CHOICE

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Worth Noting

General Electric Co.'s monthly Tariff 12 bill stands over 14-ft tall, according to Stanley Welland, GE's corporate telecommunications director.

Carrier Watch

AT&T last week announced the creation of the AT&T Home Office Network, a program under which AT&T long-distance customers who work out of their homes receive discounts on a variety of products and services.

Under the program, members receive discounts from AT&T and other companies offering such items as office equipment and supplies, and travel, business and legal services. Members will also receive a quarterly publication about additional savings opportunities and launching and operating successful home-based businesses.

AT&T estimated that 11.8 million Americans run businesses from their homes. Their ranks are growing at about 10% a year, "fueled in part by entrepreneurial verve, corporate downsizings and craving for an improved quality of life," AT&T said.

Under the plan, AT&T will offer special long-distance savings plans, telephones, facsimile machines, computers, toll-free service plans, and teleconferencing and electronic messaging services.

Other companies offering discounts to network members include Avis, Inc., CompuServe, Inc., Continental Airlines, Inc., Days Inns of America, Inc., Egghead Discount Software, Embassy Suites Hotels, Hilton Hotels Corp., H & R Block, Inc., IDS Financial Services, Inc., Panasonic Co. and United Parcel Service, Inc.

For more information, call the AT&T Home Office Network Customer Service Center at (800) 446-6311, Ext. 1000.

VMX adds mid-range voice mail system, ups high end

New products round out voice processor line.

By Bob Wallace
Senior Editor

SAN JOSE, Calif. — VMX, Inc. recently introduced a voice processing system for midsize users that want the functionality of larger systems, and expanded by 50% the capacity of its top-of-the-line product.

The mid-range box, called the VMX 200, fills a hole in the vendor's product line while the high-end VMX 300, which has been expanded from 64 to 96 ports, is designed to attract large users.

The VMX 200 is expandable from four to 32 ports in increments of four or eight ports. A four-port system supports 100 users and provides 3½ hours of storage, while a 32-port system can support 2,000 users and provides 102½ hours of storage. The VMX 200 cabinet measures 24⅘ by 13 by 19½ inches.

The VMX 200 fits into the product line between the VMX 100, which supports two to eight ports, and the VMX 300, which previously supported between four and 64 ports.

In addition, the VMX 200 replaces VMX's DIAL system, which could be configured with two to 16 ports.

RISC for speed

The VMX 200 system is based on a Reduced Instruction Set Computer (RISC) processor, which helps speed message handling and makes it possible to support multiple simultaneous voice processing applications, including voice messaging and voice response.

The system is designed so it can be maintained, repaired and expanded without taking it out of service. This capability, as well as the RISC processor, are already available with the larger VMX 300, which was announced earlier this year.

The VMX 200 can be integrated with more than 60 private branch exchanges, including

(continued on page 16)

WASHINGTON UPDATE

BY ANITA TAFF

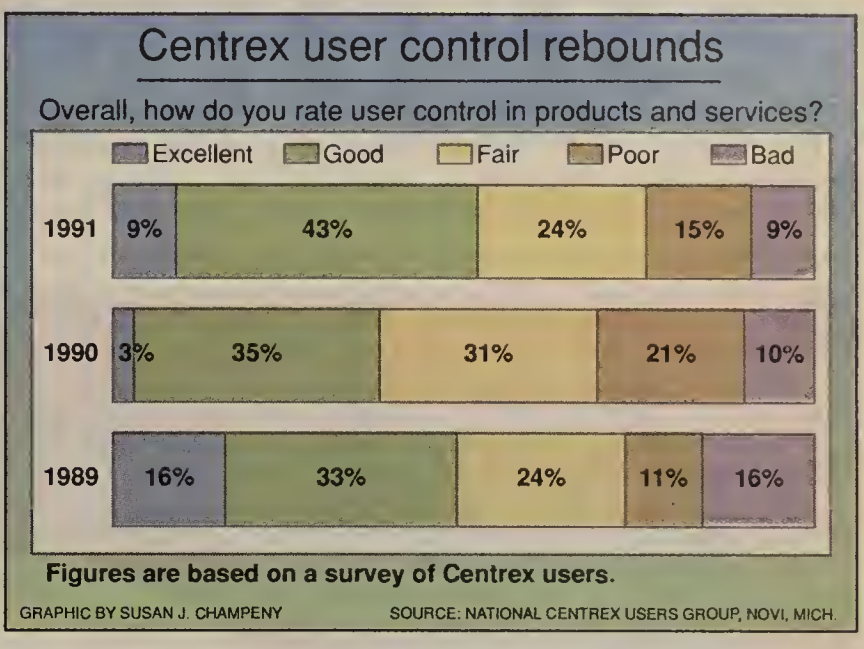
Bill requires one FCC head be an engineer. Maintaining that the public network is too important to leave in the hands of people without substantial technical skills, Rep. Don Ritter (R-Pa.) recently introduced, H.R. 3501, a bill that would require one of the five commissioners at the Federal Communications Commission be an engineer. According to Ritter, the technical complexity of issues handled by the FCC has increased dramatically during the 57 years since the agency was formed.

Having an engineer on the commission "will give a new level of technical sophistication to the FCC," Ritter said. "It will give the commission greater ability to handle the complex technical engineering questions that will be before the commission in the years to come," he said.

Ritter said that since the FCC was formed in 1934, 64 commissioners have served at the agency but only eight of them had engineering backgrounds. He also pointed out that there is little engineering expertise among support staff due to a rule change made in 1982. Until then, the Communications Act of 1934 required that at least one professional staff assistant for each commissioner had to be an engineer. Since the lifting of that rule, only one of 15 commissioners' assistants is now an engineer.

Although Ritter did not specifically mention it, his bill may have been prompted by recent concerns about network quality following a string of outages in local and long-distance carriers' networks. At a hearing last month, he scolded the FCC for doing too little to ensure network quality.

Ritter told Richard Firestone, head of the FCC's Common Carrier Bureau, "We don't want to go through [these outages] every summer. The FCC should give a guarantee that we can expect to see a marked improvement over your past performance, which is lousy."



Centrex users rate service's progress

Customers find general improvements but cite problems with contract terms, overall performance.

By Bob Wallace
Senior Editor

MINNEAPOLIS — Although Centrex customers say they are generally pleased with the service, a survey released by the National Centrex Users Group (NCUG) at its recent conference here shows growing dissatisfaction with contract terms and problems with system performance and maintenance.

These and other findings were drawn from a survey of 912 Centrex users, of which 307 responded. NCUG officials said the survey response rate was up drastically from last year, when only 137 of 950 users responded.

According to the survey, 45% of the respondents operate systems that have as many as 1,000 lines, 30% have systems with 1,001 to 5,000 lines, and 25% have systems with 5,001 or more lines.

Respondents said Centrex service providers have improved in a number of key areas during the past year. For example, 52% of the respondents rated user control of Centrex excellent or good, while 48% said it is fair, poor or bad. Last year, only 38% of all respondents rated user control excellent or good, while 62% rated it fair, poor or bad.

"The telephone companies are rolling out more and better Centrex control tools, such as on-site terminals, that enable you to perform station moves, adds and changes," said Jim Yeip, senior telecommunications analyst with Federal-Mogul in Southfield, Mich.

Centrex users are more pleased with carrier responsiveness to requests for service improvement. About 60% of the respondents said they are satisfied or somewhat satisfied with carriers' efforts to resolve dissatisfaction with the service, while 40% said they are neither satisfied nor dissatisfied, somewhat dissatisfied or dissatisfied.

Last year, 51% of the respondents said they were satisfied or somewhat satisfied with telephone companies' work to resolve user problems with the service, while 49% were neither satisfied nor dissatisfied, somewhat dissatisfied or dissatisfied.

Most users said it is becoming easier to conduct business with their service provider. About 83% said it is somewhat or very easy to do business with telephone companies, while 17% said it is somewhat or very difficult. Last year, 75% said it was very or somewhat easy to do business with the telephone companies, and 25% said it was difficult.

In terms of customer service, carriers inched ahead. About 72% rated customer service excellent or good, while 28% said it was fair, poor or bad. Last year, 69% rated it excellent or good, with 31% terming it fair, poor or bad.

However, satisfaction with service installation leaped ahead. Roughly 87% of respondents rated installation excellent or good, while 13% said it was fair, poor or bad. In 1990, 76% called it excellent or good, and 24% rated it fair, poor or bad.

The down side

Despite those improvements, carriers lost ground in overall system performance, maintenance and training.

The biggest disappointment came in the area of contract/tar-

(continued on page 16)

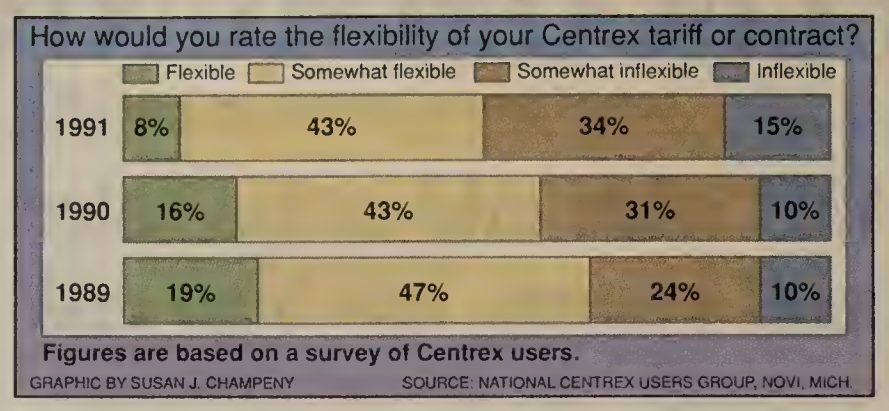
Centrex users rate progress

continued from page 15

iff flexibility. Centrex users define flexibility as a service provider's ability to offer new features, attractive pricing and term plans.

The situation has worsened substantially since 1989, when 34% of survey respondents said their contract/tariff was somewhat inflexible or inflexible. Last year, the percentage of displeased users grew to 41%. This year, 49% said their contract/tariff was somewhat inflexible or inflexible.

"It almost seems to me as though some of the [telephone companies] are moving away from Centrex, what with the increases in prices we have seen in several of territories," said Dan Gonos, Domino's Pizza, Inc.'s telecommunications manager. The pizza delivery firm uses Centrex at its headquarters in Ann Arbor, Mich., and at stores throughout the U.S.



"The [telephone companies] seem to think Centrex users will tolerate increased prices," he said. "But I think you'll increasingly find that's not the case."

Another sore spot for users is overall Centrex system performance. About 71% of the respondents rated system performance excellent or good, with 29% saying it was fair, poor or bad. Last year, 79% said performance was excellent or good, while the remainder said it was fair, poor or bad.

Centrex service providers also lost ground in the area of system maintenance. About 73% of the users surveyed rated maintenance services excellent or good, with the remainder tagging them fair, poor or bad. That's down from last year, when 80% called these services excellent or good, while the rest said they were fair, poor or bad. Users said the largest weaknesses are problem isolation and problem escalation.

Also, Centrex users are increasingly displeased with telephone companies' training programs. Last year, 38% of respondents said the services were fair, poor or bad. This year, that figure rose to 46%.

VMX adds voice mail system

continued from page 15

AT&T's Definity Generic 1 and 2, System 75 and 85; Northern Telecom, Inc.'s Meridian SL-1 and SL-100; Rolm Co.'s CBX 8000 and 9000; and NEC America, Inc.'s NEAX 2400.

The VMX 200 can also be integrated with Centrex services provided from AT&T Network Systems' 1AESS and 5ESS and Northern Telecom's DMS-100 central office switches.

Luring big companies

At the high end, VMX expanded its VMX 300 in order to make it more attractive to large organizations in campus environments.

In a maximum 96-port configuration, the system can store up to 550 hours of messages and provide service to 8,000 subscribers.

VMX sells the VMX 200 voice processing system directly to users in the U.S. and through direct and indirect channels internationally.

The VMX 200 is available now and ranges in price from $20,000 to $200,000, while the VMX 300 costs from $50,000 to $600,000. The new 96-port version of the VMX 300 is scheduled for availability in the first quarter of 1992.

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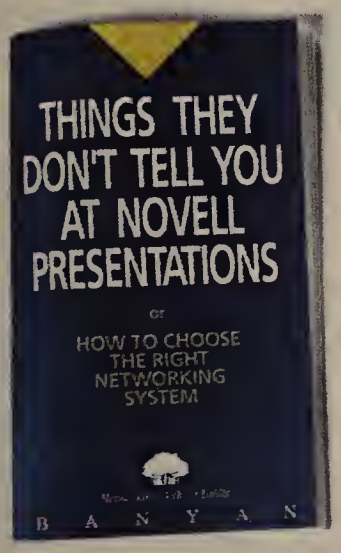

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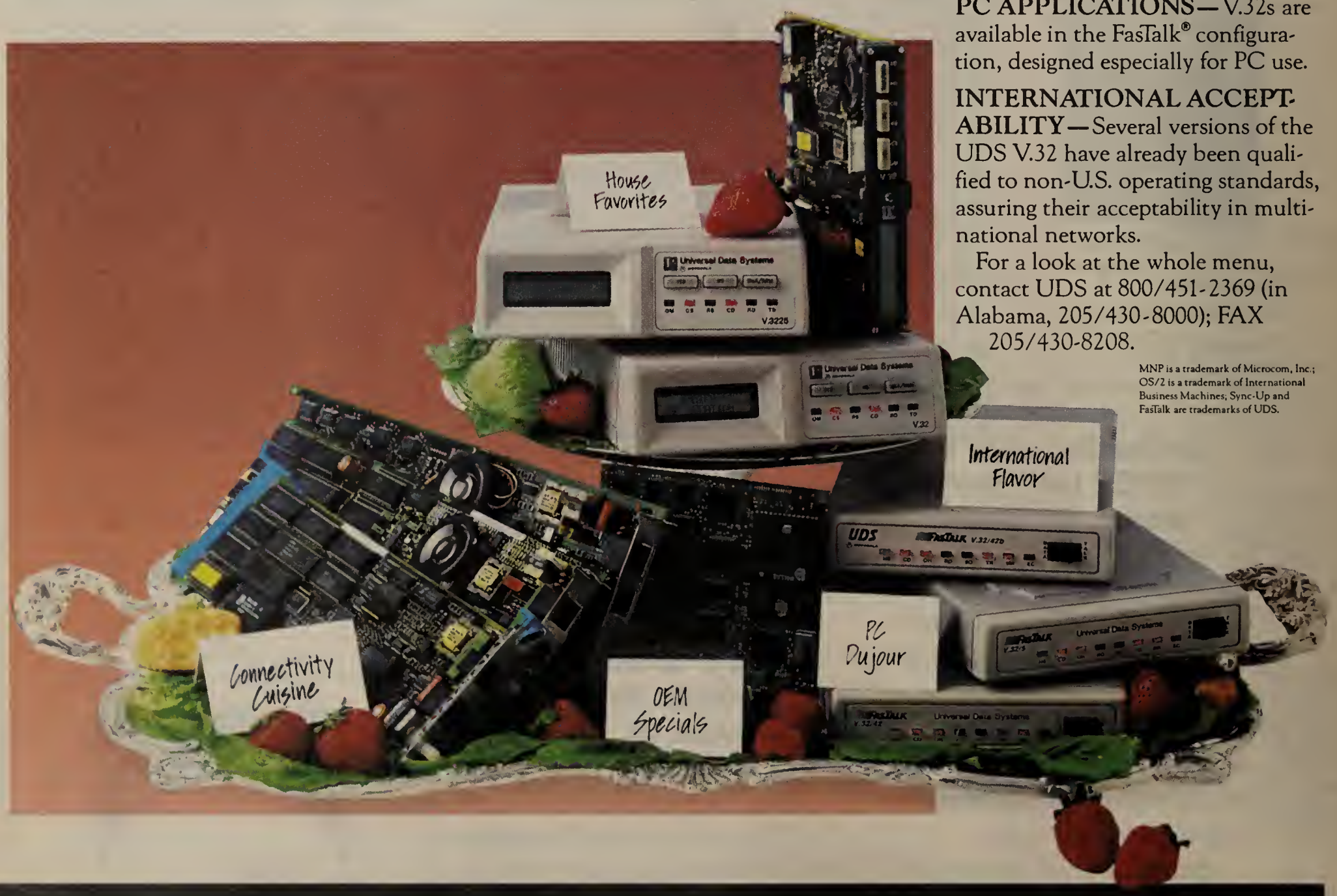

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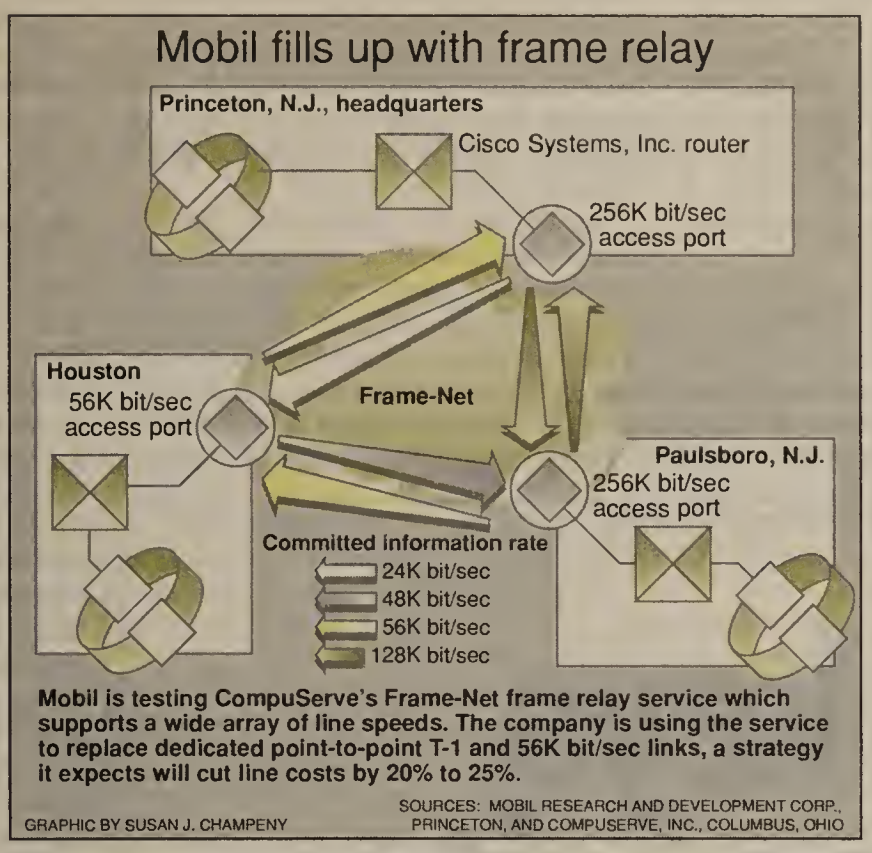
David Sherr
Vice-president of open architecture
Securities Information Group
American Express Information Services Corp.
New York

Data Packets

Systems Center, Inc. of Reston, Va., last week announced that its Network Data Mover (NDM) automated data transfer product family has been enhanced to support IBM's LU 6.2 protocol. LU 6.2 support will be available in November on a limited basis for the NDM versions based on MVS and IBM's Application System/400. General release is scheduled for the first quarter of 1992.

Sterling, Va.-based **FastComm Communications Corp.** last week announced two new management options for its dial-up and leased-line modems. The modems now support IBM's Link Problem Determination Application-2 (LPDA-2) protocol. FastComm also announced a new Simple Network Management Protocol (SNMP) agent that lets the modems be managed by an SNMP management system. LPDA-2 support is available now, and the SNMP agent is due out in the first quarter of 1992.

ARDIS Co. recently announced support for connections to its radio-frequency network from IBM host CICS applications via the LU 6.2 protocol. The ARDIS LU 6.2/CICS Interface is an application program interface that ARDIS said eliminates the need for programmers to understand the details of LU 6.2 when developing CICS applications intended for use with the ARDIS radio net. For more information, contact ARDIS at 300 Knightsbridge Pkwy., Lincolnshire, Ill. 60069, or call (708) 913-1215.



Mobil division beta-testing CompuServe's frame relay

Frame-Net service to help cut leased-line costs.

By Bob Wallace
Senior Editor

PRINCETON, N.J. — Mobil Research and Development Corp. recently said it is beta-testing CompuServe, Inc.'s new frame relay service to link local-area networks at three locations.

The service, dubbed Frame-Net, is expected to help Mobil cut monthly leased-line charges, provide more efficient interconnection of geographically dispersed token-ring LANs and enable it to extend the reach of its network to outside contractors.

If Mobil decides to use Frame-Net, it will reduce its leased-line costs by 20% to 25%.

▲▲▲

"The CompuServe service has certainly met our needs," said James Owens, Mobil's group leader of computer services.

"We've been pleased with the performance of the service since we began using it in July and are excited about potential cost savings," Owens said.

He declined to discuss the cost of the frame relay service or specific savings.

Announced in January, Frame-Net is supported by 15 StrataCom, Inc. IPX T-1 multiplexers in CompuServe's backbone. That support is expanding to include more than 50 IPXs.

Frame-Net supports 56K and 256K bit/sec in addition to T-1 access port speeds but offers the service in committed information rates (CIR) ranging from 4K to 512K bit/sec. A customer can assign any number of channels on the link to support the frame relay service.

The service supports permanent virtual circuits, meaning paths are fixed between end points and packets always follow the same route.

Before testing Frame-Net, Mobil used point-to-point AT&T 56K bit/sec and T-1 lines to link its headquarters here, a large refinery in Paulsboro, N.J., and a major contractor in Houston. The sites use Banyan Systems, Inc. VINES LANs.

Mobil has linked Banyan VINES LANs at three locations using IGS and AGS multiprotocol routers from Cisco Systems, Inc. Two sites are connected to 256K bit/sec ports and a third to a 56K bit/sec port.

The company uses CIRs ranging from 24K to 128K bit/sec (see graphic, this page).

Applications supported include database access, image transfer and remote workstation access to centralized file servers.

"We've seen very satisfactory service, and throughput has improved," Owens said. If Mobil decides to permanently use Frame-Net, it will reduce its leased-line costs by roughly 20% to 25%, he said.

Although Mobil operates its own private T-1 backbone net, it

(continued on page 20)

DEC provides bevy of Ultrix-to-SNA links

Products help DEC fill out NAS initiative, quiet customer demands for nonproprietary platforms.

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp.'s recent spate of internetworking and net management introductions included software to link its Ultrix-based processors to IBM Systems Network Architecture environments.

The Ultrix/SNA products are a mirror image of similar products DEC already provides for the VMS environment, according to Dave Korf, DEC's manager of open network software.

By porting its SNA connectivity software to Ultrix, DEC is both filling out its Network Application Services (NAS) initiative and bowing to customer demand for nonproprietary platforms, according to Mark LaRow, a senior manager at Ernst & Young, a consultancy in Vienna, Va.

"DEC's commitment [to openness and application portability] is based on NAS, which says that any capabilities they give to VMS, they also give to Ultrix," LaRow said. "They're allowing Ultrix to catch up" to VMS.

Unix is becoming a general-purpose operating system, instead of a niche platform for scientific and engineering applications, LaRow said. As such, there's pent-up demand in the marketplace for connecting Unix-based systems to corporate data centers where IBM mainframes roost.

The new products include:

- DEC's Ultrix/SNA Server software, which sits on a DEC VAX or Reduced Instruction Set Computer (RISC) processor and establishes links between one or more Ultrix systems and an IBM host in an SNA network. Communications between Ultrix systems and the Ultrix/SNA Server uses the Transmission Control Protocol/Internet Protocol.

Sessions can be initiated by either the Ultrix or SNA environment, DEC said. The Ultrix/SNA Server connects to an SNA host using X.25 or Synchronous Data Link Control links.

Hosts recognize the Ultrix/SNA Server and attached processors as IBM Node Type 2.0 and 2.1 devices. As many as four

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NTI airs ISDN interface for frame relay module

By Paul Desmond
Senior Editor

SAN JOSE, Calif. — Northern Telecom, Inc. recently announced and demonstrated at INTEROP 91 Fall here a new ISDN interface for its frame relay switch module, a product that will enable carriers to support switched access to frame relay services to drive down access costs.

The announcement makes good on Northern Telecom's promise to enhance its Link Peripheral Processor (LPP) — a central office switch module that supports frame relay — to support switched services.

Scott Schauer, a senior product manager at Northern Telecom, said the carrier implementation of the Integrated Services Digital Network Basic Rate Interface (BRI) on the LPP could reduce frame relay access line costs in some configurations and increase access speed.

For example, a university could use BRI to give hundreds of users access to a single T-1 frame relay private virtual circuit connected to a host. The configuration would enable users to access the service at 56K bit/sec (the current maximum for the capability) as opposed to the typical 1,200 or 9.6K bit/sec modem connection used by many today.

The announcement makes good on Northern Telecom's promise to enhance its LPP.

▲▲▲

"I think it's a great idea," said Rick Malone, principal at Vertical Systems Group, a consultancy in Dedham, Mass.

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DEC provides bevy of Ultrix-to-SNA links

continued from page 19

physical units are supported per server, and each physical unit can support 32 logical links, DEC said.

The offering ranges from $1,155 to $16,345 and will be available in February.

■ The new Ultrix Load Host for DECnet/SNA Gateways lets Ultrix-based machines, instead of VMS systems, download gateway code to VAX and RISC Ultrix DECstation and DECsystem processors so that they can function as gateways. Pricing for the Ultrix Load Host is included in the price of the DECnet/SNA Gateway.

■ DECnet/SNA Ultrix 3270 Terminal/Print Services software enables users on one or more Ultrix systems to establish 3270 sessions to IBM systems via the Ultrix/SNA Server or DECnet/SNA Gateway.

The program supports 3270 terminal and 3287 printer emulation, 3270 personal computer file transfer to VM and MVS systems, hot-key switching between Ultrix and mainframe applications, and LU 1 and LU 3 sessions for SNA character string and 3270 data stream formats, respectively, according to DEC.

The product ranges from $225 to $9,420 and will be available in February.

■ DECnet/SNA Ultrix Remote Job Entry (RJE) is software that provides batch job submission and transfer between Ultrix systems and IBM SNA systems via the Ultrix/SNA Server or DECnet/SNA Gateway.

DECnet/SNA Ultrix RJE receives job output from an IBM mainframe after submission of a batch job for processing, updates IBM databases of submission/receipt transactions, provides file transfer between IBM hosts and Ultrix systems, and supports data compression. DECnet/SNA Ultrix RJE costs $225 to $10,676 and will also be available in February.

■ The DECnet/SNA Ultrix APPC/LU 6.2 Tool Kit and Run Time software provides communications between Ultrix and SNA applications via IBM's LU 6.2 protocol. Communications is initiated via the Ultrix/SNA Server or a DECnet/SNA Gateway. The tool kit provides LU 6.2 and PU 2.1 support for developing LU 6.2 cooperative processing applications in an Ultrix environment. It can allocate and deallocate LU 6.2 basic and mapped conversations. The offering can initiate a session from an IBM system, and the run-time version supports peer-to-peer communications between IBM systems and Ultrix applications supporting LU 6.2 applications.

The run-time version is installed on all systems that will run LU 6.2 applications developed using the tool kit.

The DECnet/SNA Ultrix APPC/LU 6.2 Tool Kit license ranges in price from $915 to $38,308. The run-time license costs $195 to $8,164. Both products will be available in February.

■ The DECnet/SNA High-Level Language Application Program Interface (HLLAPI) Tool Kit and Run Time packages provide a 3270 Data Stream programming interface between Ultrix and SNA applications. Like the other products, communications is initiated via the Ultrix/SNA Server or DECnet/SNA Gateway. The tool kit provides a library of routines that are linked into programs and can support automatic data entry system applications, as well as local/host distributed or multihost distributed applications. It also supports file transfer.

The run-time version is said to allow peer-to-peer communications between IBM system and Ultrix HLLAPI applications developed using the tool kit. It runs on all systems that execute those HLLAPI applications.

The HLLAPI tool kit is priced from $765 to $32,028. The run-time version is priced from $195 to $8,164. Both programs will be available in February.

■ The DECnet/SNA 3270 Data Stream Programming Interface (DSPI) enables programmers to develop Ultrix applications that communicate with IBM applications via the LU 2 session protocol. Communications is fostered through the DECnet/SNA Gateway.

Applications developed with the 3270 DSPI can emulate 3270 terminal applications. File-transfer applications that use the 3270 extended data stream to communicate with third-party software running on an IBM host can also be developed, according to DEC.

Prices for the 3270 DSPI range from $450 to $28,400. It is available now.

Mobil beta-testing frame relay service

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faces the tall task of periodically adding sites of construction contractors that it teams up with on projects.

"The difficulty for us is getting to non-Mobil sites, such as the location in Houston," Owens said. "Setting up leased lines to those locations can be a time-consuming and expensive proposition." In some cases, Mobil used dial-up links.

"Projects start and finish all through a year and last about two to three years," Owens said. "We are steadily starting projects in new locations and taking others down. And that doesn't lend itself for permanent links to a private network. We like the idea of using a single vendor end to end and having [that vendor] responsible for managing the service."

Although he declined to say if Mobil is considering using frame relay in its private network, Owens admitted that the proposition is interesting. "Private frame relay sounds like many companies should look at it," he said.

Three keys to data security:

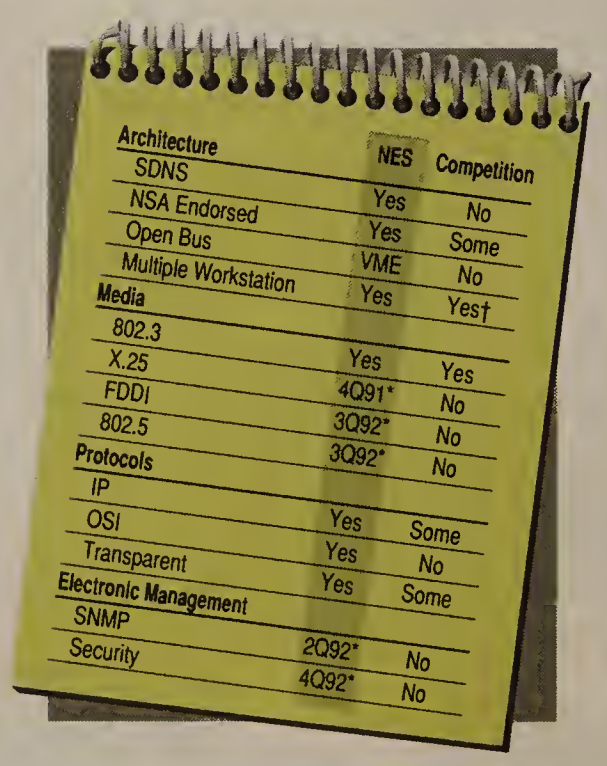
SDNS · EKMS · NES

The Network Encryption System (NES) from Motorola is the first system to use the Secure Data Network System (SDNS) standards from NSA, and that interfaces to the National Electronic Key Management System [EKMS].

The NES is a family of data security products that provide the most advanced and flexible network security solution available today.

The new SDNS standards have been incorporated into the hardware, firmware, and software, including a full, 7-layer OSI protocol stack, thus allowing connection to the EKMS. An open architecture is implemented by providing separate VME buses on both the host and the network sides. Thus, the Motorola NES is able to quickly adjust to different media requirements with commercial, off-the-shelf technology.

One NES Platform can accommodate multiple hosts and workstations by using standard LAN host connections. With software such as IP, OSI and Transparent,



Architecture	NES	Competition
SDNS	Yes	No
NSA Endorsed	Yes	Some
Open Bus	VME	No
Multiple Workstation	Yes	Yes†
Media		
802.3	Yes	Yes
X.25	4Q91*	No
FDDI	3Q92*	No
802.5	3Q92*	No
Protocols		
IP	Yes	Some
OSI	Yes	No
Transparent	Yes	Some
Electronic Management		
SNMP	2Q92*	No
Security	4Q92*	No

the NES is able to link industry standard workstation protocols such as TCP/IP, OSI, DECnet, XNS and more.

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* Planned releases † Requires additional external bridges and or special factory strapping

Worth Noting

Apple Computer, Inc. does not intend to bring out a central management console. The company will rely on consoles from other vendors such as IBM but will support the Simple Network Management Protocol, according to Robert Wohnoutka, manager of product marketing for Apple networking systems in Cupertino, Calif.

Netnotes

Digital Products, Inc. last week at NetWorld 91 Dallas introduced LANSprint for VINES, a print server for Banyan Systems, Inc. VINES networks.

According to the Waltham, Mass.-based firm, LANSprint for VINES can increase by as many as 30 times the speed of graphics printing and font downloads on Banyan VINES networks.

"A single page of business graphics could have as much as 400 times the amount of data as a single page of text," said Cornelius Peterson, president of Digital Products.

"These graphics documents cause a network printing bottleneck," he said. "By speeding up the printing of graphics, LANSprint for VINES alleviates the bottleneck."

LANSprint for VINES consists of software and an add-in board that is installed into either a dedicated or nondedicated AT microcomputer or a Micro Channel Architecture-based personal computer.

LANSprint for VINES costs $495 for a single-port board and $695 for a dual-port board.

As many as six LANSprint for VINES boards can be installed in a dedicated or nondedicated workstation. The product will be available in mid-December.

Motorola adds software, servers to RISC 8000 line

Wants to offer full complement of Unix products.

By Timothy O'Brien
West Coast Bureau Chief

SAN JOSE, Calif. — Motorola Inc.'s Commercial Systems Division (CSD) recently announced three entry-level servers for its RISC-based 8000 series and a program under which it has assembled software and other networking products for use with the servers.

The three new servers — the 8220, 8420 and 8620 — are based on a new design that reduces the components of an entire Unix computer to a single board. The company claims that the servers support from four to 500 users and offer a price/performance ratio of $236 per million instructions per second.

Motorola CSD will offer these new Reduced Instruction Set Computer models with Microsoft Corp.'s LAN Manager/X, a version of Microsoft's network operating system ported to Unix. Many other connectivity and application software products will also be available under the Multi-Personal Networking program.

The program will enable new and existing servers in the 8000 series to support personal computers, Apple Computer, Inc. Macintoshes and Unix workstations.

"We're putting together the enabling technologies to connect the desktop to our Unix servers," said Howard Amundsen, director of marketing for Motorola CSD. "This is the first step, with more to follow."

Overall, analysts said they see the Motorola strategy as sound.

"They've covered a lot of bases and have put together a full offering of networking options," said David Card, director of systems research at International Data Corp. in Mountain View, Calif. "I think they are taking this business seriously."

A new direction

Offering Unix machines as LAN servers is a shift for Motorola, which has historically sold its Unix machines in multiuser configurations supporting terminals instead of workstations.

Motorola now believes that the scalability limitations of Intel Corp. 80486-based servers and the growth of Unix in the office will fuel the growth of the Unix server market.

Motorola CSD is hoping that

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Hard-to-guess passwords a critical key to security

By Salvatore Salamone
Features Writer

SAUSALITO, Calif. — Passwords are often the only thing standing between a hacker and a network, yet even novice hackers can break into many networks because users typically select passwords that are easy to guess.

Passwords, for example, are often based on user identification. A General Accounting Office study found that 30% of the systems on the Internet could be penetrated by guessing a password that was a form of a user's ID or logon, such as the ID itself or the ID spelled backwards.

Users also often select common acronyms or words that are easy to guess. Robert Morris, designer of the Internet worm, exploited this fact to infiltrate systems tied to the Internet. He used a list of 73 words as his first attempt at accessing a system. The list contained common names and words that Internet users would frequently use in their daily work, such as algebra and Einstein. Reportedly, more than 90% of the large computer systems on the Internet have at least one user with one of Morris' 73 words.

If his words did not match up with a password, Morris resorted to the tried-and-true method of many hackers: the dictionary. A Syracuse University study found that 45% of the passwords on large computer systems were English words and 60% of the users would choose a password based on a proper name, a geographic location or a word in a dictionary.

Given these statistics, it is obvious end users should be encouraged to choose passwords that are harder to guess. Toward that end, Charles Wood, a management consultant specializing in information security, has developed a software package called Password Coach, which subjects user-chosen passwords to 39 tests to ensure that all users em-

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Software integrates video into data files

Client/server-based products let users add full-motion video to Windows PC applications.

By Joanne Cummings
Staff Writer

SAN JOSE, Calif. — Fluent Machines, Inc. demonstrated at the recent INTEROP 91 Fall show here prototype software that enables users to integrate full-motion video into word processing and other applications designed to work with Microsoft Corp. Windows.

The company's Fluency line of client/server products is targeted at users that want to incorporate video output into network applications used for purposes such as corporate training and on-line repair manuals.

For example, the client portion of the product, which is currently available, is being used by the University of Massachusetts at Lowell to develop multimedia training documents and by Nynex Corp. to develop a wide-area video/data network linking two corporate sites.

Fluency includes FluentStreams software and two add-on boards for AT-compatible client microcomputers as well as prototype FluentLink server software.

FluentLink enables digital video files to be stored on a server and transmitted over Ethernet or Fiber Distributed Data Interface networks. The product, which will initially work with Novell, Inc.'s NetWare 386 Version 3.11, will be formally announced in November and should be available by year end.

Although the products will work over 10M bit/sec Ethernet, Fluent said each full-motion video link consumes about 2M bit/sec of bandwidth on average, meaning an Ethernet can only support three to six concurrent users. Fluent, therefore, recommends that the product be used with 100M bit/sec FDDI networks, which can support between 25 and 30 clients.

INTEROP demo

In the INTEROP demonstration, Fluent used a Compaq Computer Corp. Extended Industry Standard Interface-based server running NetWare 3.11.

Two client personal computers, each a 33-MHz 80386-based machine configured with two video boards and FluentStreams, were linked to the server via an FDDI network. All of the devices were attached to the FDDI net with interfaces from Network Peripherals.

In the demo, several prerecorded video files were stored on the server. FluentLink, a NetWare Loadable Module on the server, controlled the compression and playback of the video files to the client workstation in real time.

In actual use, FluentLink can decrease bandwidth requirements by lowering the number of video frames sent across the net, from say 30 to 15 frame/sec.

The decrease in frames per second corresponds to a decrease in bandwidth used, the company said. Although this feature degrades the picture, making it look slightly jumpy, the audio portion of the video remains uncut and synchronized with the picture.

Once the video file has been sent across the network, users at client workstations can view and edit it. Users can scroll through the video using Windows elevator

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Passwords key to net security

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ploy hard-to-guess passwords.

Among the tests Password Coach conducts is a comparison with a list of dictionary words, acronyms, common first and last names, and legal, geographical, biblical, medical, technical and scientific words.

Password Coach runs on Novell, Inc. NetWare local-area networks. Turnkey interface versions for IBM Application System/400 and Digital Equipment Corp. VAX/VMS systems are also available.

Password Coach is invoked when users attempt to create or change their password. "If the password is found to be weak, Password Coach will ask the user to select another password," Wood said. Users get several attempts to create a password. If they fail to come up with one, the program generates a password.

Some users balk at the idea of hard-to-guess passwords, claiming that they are also hard to remember. Wood suggests the following ways to create easy-to-remember but hard-to-guess passwords:

- Type a common word, but shift your hands up one or two rows on the keyboard. For example, shifting one row up on the keyboard changes "easy" to "3qw6."
- Bump each character in a word up or down one letter in the alphabet. For example, bumping each letter up turns "easy" into "fbtz."
- Use Wood's personal favorite, a password made up by stringing words together. He suggests an environmental clue to help remember the phrase. "Look at something that is in sight where you work," Wood said. In the case of this reporter, the password would be "onebigmess."

Motorola adds to 8000 line

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the combination of its MultiPersonal Networking products with new, aggressively priced servers will differentiate its offerings in the competitive Unix server business.

The new MultiPersonal Networking products are designed to provide users with a variety of choices to meet specific networking requirements.

At the low end in terms of cost and functionality, Motorola is offering Locus Computing Corp.'s PC Interface, a local-area network software product that provides simple file transfer between Unix servers and DOS, Microsoft Windows and Macintosh clients.

Another LAN software product is SMB/ix from Micro Computer Systems, Inc. of Irving, Texas. SMB/ix is low-cost LAN software that allows Unix servers to provide file and print sharing as well as virtual terminal capabilities to DOS and OS/2 clients.

At the high end, Motorola is offering its servers with LAN Manager/X, Microsoft's networking software for Unix.

The firm is also offering the NetWare Compatibility Module (NCM), supplied by an undisclosed vendor, to provide a way for NetWare clients to be connected to the LAN Manager/X environment.

Since the NCM supports programming interfaces based on Novell, Inc. protocols, NetWare clients can access Unix applications. In addition, Motorola is offering NetLink, a NetWare-compatible software option from Micro Computer Systems that provides personal computer users with virtual Unix terminal capabilities.

For Macintosh connectivity to Unix servers, Motorola is providing PacerLink, PacerShare and uShare from Pacer Software, Inc. of La Jolla, Calif. These products offer network communications, basic file transfer and dynamic translation of Macintosh and DOS file formats into native Unix host files.

Another networking software product is Powerfusion from Performance Technology, Inc. of San Antonio, Texas. This offering provides bridging between personal computer-based LANs and Unix servers.

Finally, included under Multi-

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Pack integrates video into data

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boxes, which are vertical scroll boxes on the side of the screen, or they can scan the video on a frame-by-frame basis, the company said. Edits can be made by simply cutting and pasting either within the file or between files.

The FluentStreams software takes advantage of Windows' Dynamic Data Exchange feature, enabling users to hot-link with the video file and pop up a video window within any application. Then, using sample scripts provided by Fluent, users can incorporate the video file into any Windows application, such as Microsoft Word or Excel.

The software also enables users to integrate live video into an application. Fluent said this feature is useful in financial applications, where users may want to watch a live video feed of a stock market report, for example, while accessing recorded video files within their application.

In addition, the product lets users create their own video files. Recording the video requires a camera or videocassette recorder that is linked to an industry-standard connector on the board in the client's workstation.

Users create a file within the Windows application and begin recording the video. The recording is automatically stored to the file, which users can edit before storing on the net server or sending to another user for review.

When recording, users can choose the compression rate and pixel resolution by using simple menus. The product can record at resolutions as high as 320 by 120 pixels. This is slightly below the standard VHS-quality recording of 640 by 40 pixels.

Fluent product users

The University of Massachusetts at Lowell is using the Fluent products to build a multimedia repair manual for use in its "Factory of the Future," a prototype robotics factory designed to fully automate factory processes from design to assembly.

"We see a tremendous need for interactive communications on the shop floor for on-line reference and just-in-time training," said John Koegel, assistant professor at the school and codirector of the interactive media group, a research lab of multimedia systems at the university.

The university is using Fluency to create the *Robotic Workcell Repair Manual*. The manual will serve as a reference tool for technicians who need to perform complex diagnostics and repair procedures.

While viewing the manual at a personal computer equipped with Fluent hardware and software, the technicians click on graphical representations of machine parts, bringing up full-motion videos that show typical problems and how to fix them.

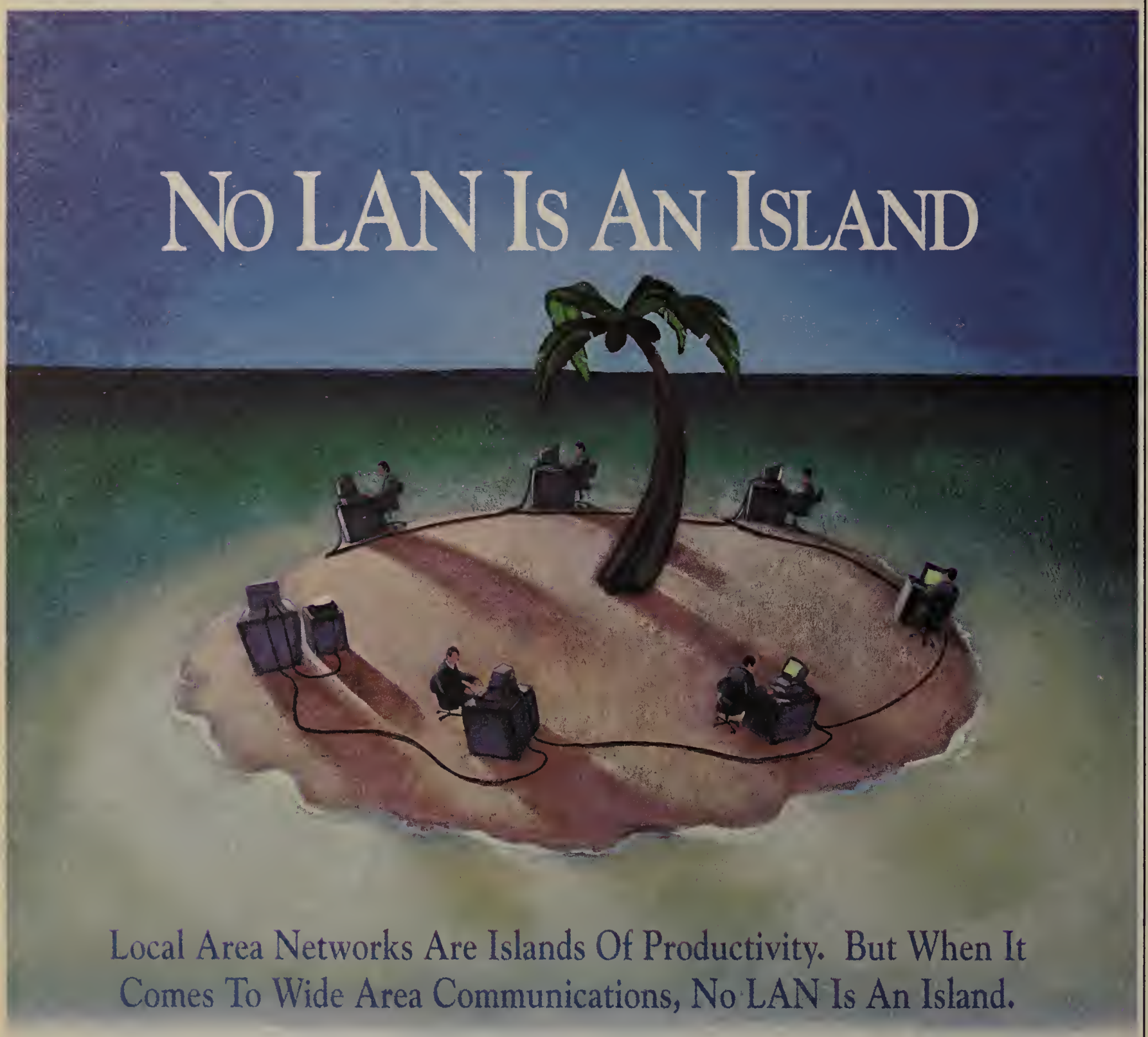
"The nice feature about Fluency," Koegel said, "is that you can have multiple video windows on the screen at the same time and the hardware that handles the video processing can handle more than one video stream at a time." Also, the video files can be easily reshot and updated as new techniques and repair procedures become known, he said.

Another user of Fluent's technology, Nynex, is also an investor and strategic partner of Fluent.

Nynex has taken the Fluent technology and applied it to an internal application it calls Nynex Shuttle. The application provides video communications services between the company's research facilities in Boston and its White Plains, N.Y., headquarters.

Nynex Shuttle provides point-to-point data transmission between the local-area networks at each site using Nynex's Switched Multimegabit Data Services. The company plans to use Fluent as a base for providing real-time desktop videoconferencing, access to server-based video libraries and video mail as well as to conduct remote presentations between the two sites.

"Fluent allows you to do things with video that you can do with data," explained Eddie Singh, project manager of the Nynex Shuttle in the Nynex Science and Technology group. "It exists as just another media object in your computer."



Worth Noting

"Hell . . . is a place where nothing connects with nothing."

T.S. Eliot
Poet
Excerpt from
"The Cocktail Party"

Association Watch

The **Society of Manufacturing Engineers (SME),** an international professional society geared to advancing scientific knowledge in the field of manufacturing engineering and management, has expanded its reference library at the SME International Headquarters in Dearborn, Mich. This was in response to a growing demand for manufacturing information from SME members, staff, students, manufacturers and the business community.

The SME library contains 460 magazines and journals, and more than 7,000 book titles on automation and manufacturing engineering. The expansion includes a video viewing area and databases kept on CDROM. The CDROM system enables users to search over 300 periodicals for a particular area of interest or to find information filed with the Securities and Exchange Commission on public companies.

Another function of the library is the Information on Technology in Manufacturing Engineering (INTIME) Manufacturing Data Bank Search Service. INTIME is a computerized record of every technical paper, book and magazine article published by SME.

Also, INTIME can help engineers find information for writing justification reports, completing research projects, undertaking feasibility studies and comparing the performance of manufacturing applications.

Typical library hours are 8 a.m. to 5 p.m. weekdays. Anyone seeking information about a particular manufacturing topic can call SME librarian Paulette Groen at (313) 271-5340.

Value of videoconferencing dependent on user training

Video meetings leave uninitiated users frustrated.

By Wayne Eckerson
Senior Editor

While videoconferencing technology has come a long way in recent years, most business professionals are still unsure of how to conduct successful meetings over video links.

Network managers, in fact, cannot presume their job is done once they have installed a system, consultants say. They have to train professionals to conduct videoconferences or risk employees simply dismissing the technology as useless.

"[Videoconferencing] technology is a magnifying lens that focuses on group interaction behavior," said Doug Widner, an independent consultant in Lexington, Ky., who specializes in videoconferences and business television. "If your meeting skills aren't effective in face-to-face meetings, they will be doubly ineffective in videoconferences."

Widner recently teamed up with Eric Craven, a specialist in organizational behavior, to write *Create Outstanding Videoconferences,* a 135-page, spiral-bound book that describes techniques needed to conduct successful videoconferences.

Videoconferencing puts a premium on preparation and good meeting skills, especially when the videoconference involves multiple sites, the authors said. Coordinators need to know how to schedule the videoconference, use audiovisual materials, and stage and produce the videoconference.

"Meetings have to be planned, otherwise, people will get ensnarled in the technology," Craven said.

The technology often becomes an impediment when meeting planners fail to define the best manner for switching audio and video signals between multiple sites. Most videoconference systems use voice-activated switching, whereby the video feed is captured by the location generating the loudest sound. Typically, this allows the TV monitors to show the person speaking, no matter where they are.

However, voice-activated switching can be less than satisfactory when a person in one location sneezes or makes a loud noise while someone else is speaking.

Meeting coordinators should,

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GUIDELINES

BY ERIC SCHMALL

Advancement requires ability to change stripes

According to a military anecdote, a young second lieutenant was chauffeuring a visiting general around an Army post when his distinguished passenger asked to be driven over to Firing Range A.

"Sir, I think you'll find Firing Range B to be much more interesting," the lieutenant responded. "Perhaps," replied the general, "But I still would prefer to see Range A."

When the junior officer continued to argue that Range B was much more worthwhile, the general interrupted him, saying, "Lieutenant, you certainly are determined, aren't you?"

Taking this as a compliment, his driver beamed, "Yes, sir. I'm sure that you didn't reach your rank by being slavishly obedient to everyone."

"No," the general allowed, "but that's how I made captain!"

What does it take to move up the management ladder in the telecommunications profession? As in any other hierarchy, it requires a changing skill set. A first-level supervisor who becomes successfully versed in the essentials of leadership and management has to do more than just get better at applying those ideas. Some behaviors and outlooks have to be shed and others acquired to make the successful transition from primary

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Schmall is a network systems manager for an insurance holding company.

"The X12 community is totally different than it was two or three years ago. It now has a mixed constituency whose needs have to be served and balanced with the needs of other groups."

▲▲▲

Jeff Sturrock
Chairman
ANSI Accredited Standards Committee X12

Sturrock sets goals as head of EDI group

Plans to streamline EDI standards development by speeding the process while retaining quality.

By Wayne Eckerson
Senior Editor

NASHVILLE — The ANSI committee in charge of electronic data interchange recently elected Jeff Sturrock to lead the rapidly growing EDI standards-setting body for the next two years.

In an interview shortly after his election, Sturrock said his major goals are to further streamline the EDI standards development and maintenance process and find ways to balance the needs of the growing number of constituencies within the ANSI Accredited Standards Committee X12.

Sturrock, a senior manager in Ernst & Young's national information technology group in Dallas, edged out Ken Shoquist, manager of procurement and EDI systems at Texas Instruments, Inc., in the elections. Sturrock is former chairman of the North American EDI for Administration, Commerce and Transport (EDIFACT) board, which is helping to develop EDIFACT, an emerging international EDI standard.

Susan Rapp, chairwoman of X12's finance committee and an EDI consultant at PNC Financial Corp, was elected vice-chairwoman.

The rapid growth of X12, the group that defines standard formats for exchanging business documents electronically, has put a tremendous strain on the EDI standards development process, Sturrock said. Four years ago, X12 had 67 members and 60 standards under development. Today, the group has 534 members and more than 250 standards under development or in trial use.

While many new procedures have been put in place during the past several years in order to streamline the development and maintenance process, there is still much more that can be done, Sturrock said. The key, however, is to speed up the process without sacrificing the quality or stability of X12 standards, he said.

One area Sturrock plans to examine is whether X12 can unify the American National Standards, which are ANSI-approved, and the draft standards for trial use, which are X12-approved. The draft standards for trial use can become American National Standards once they stand for a public comment period, he said.

"There has been talk that we are doing a disservice to our users by having two sets of standards," Sturrock said. "I don't see why we can't produce American National Standards in a more timely manner."

Sturrock said he wasn't sure yet how to unify the two sets of standards, although he was optimistic that it can be done.

Another way to streamline standards development is to introduce techniques such as data and process modeling. Sturrock said several X12 members have experimented with data and process modeling tools and have found they significantly speed up

(continued on page 27)

"There has been talk that we are doing a disservice by having two sets of standards."

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Aerospace industry to educate trading partners about EDI use

Educational conference targeted at small to midsize firms.

By Wayne Eckerson
Senior Editor

DALLAS — In an effort to increase the use of electronic data interchange among suppliers, the aerospace industry next month will sponsor an educational conference geared to small and midsize businesses.

AEROTECH 2000, which will be held Nov. 19-20 at the Sheraton Park Central Hotel & Towers here, will offer more than 40 sessions that range from basic tutorials on EDI technology and strategic planning to federal government EDI programs and advanced EDI applications.

The cost of the two-day event is $195. The price was kept low in order to attract small and midsize businesses that may not be able to pay the typical $900 or more, plus travel costs, for attending other major EDI shows, according to Mark Payne, EDI manager at Texas Instruments, Inc.

> "We are trying to show that EDI is for everybody, not just Fortune 500 companies," Payne said.
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Payne said the AEROTECH 2000 conference will be held several times in 1992 at locations where aerospace industry suppliers are concentrated, such as Texas and Southern California. Dates and locations of future AEROTECH 2000 conferences have yet to be determined.

"We may be setting a trend by aggressively going out and courting the small business owner with an EDI conference designed for a Fortune 500 company," Payne said.

Like many large aerospace contractors, TI has an aggressive EDI program. While it counts hundreds of trading partners, 60% of its procurement is done with small businesses in nonelectronic fashion, he said.

"We are trying to show that EDI is for everybody, not just Fortune 500 companies," Payne said.

During the second day of the conference, eight major aerospace contractors — The Boeing Co., General Dynamics Corp., Hughes Aircraft Co., Lockheed Corp., The LTV Corp., McDonnell Douglas Corp., TI and TRW, Inc. — will present information about their EDI programs and discuss how suppliers can trade electronically with them.

Sponsors of AEROTECH 2000 include the Aerospace Industries Association, the United States Small Business Administration, the Department of Defense, the Defense Logistics Agency, the Electronic Mail Association, the Certified Electronic Trade Professional Association, the Purchasing Management Association of Dallas and a number of regional EDI user groups.

The keynote speakers will be Ralph Szygenda, vice-president and manager of information systems and services in TI's Information Technology Group, and Maj. Gen. Richard Smith, commander of the San Antonio Air Logistics Center at Kelly Air Force Base in Texas. Smith played a major role in managing logistics during the Persian Gulf War.

For additional information, contact AEROTECH 2000, P.O. Box 940623, Plano, Texas 75094, or call (214) 578-2373.

Videoconferencing depends on training

continued from page 25

therefore, block out each segment of their meeting and define how the video will be switched, if necessary. Depending on the nature of the meeting, planners can request that the video be fixed on one site, alternate at fixed intervals between sites or follow the loudest voice signal. They can also request that audio recording be open at all sites or blocked from all but specified sites.

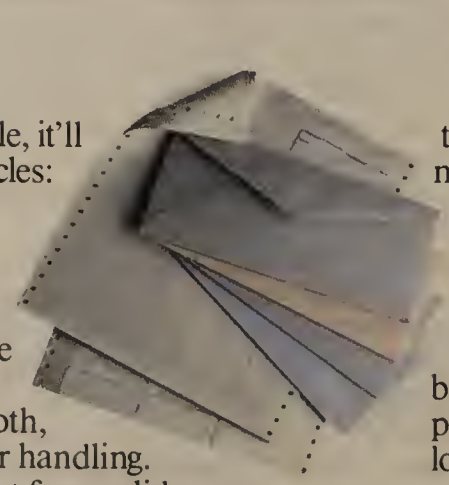
The authors also suggest that users pay attention to the layout of the room, especially the shape of the table. A long table where everyone sits on the same side gives a feeling of openness and is suitable for talking to clients.

But when people sit opposite from each other, it gives a conspiratorial feeling. This arrangement should only be used when talking with people who are well-known to the group. A good compromise is a table shaped as a half-circle, the authors said.

Craven and Widner also support the use of videoconference audiovisual materials, such as graphics, slides and videotapes. Their book details how to use a second camera to transmit graphics and visuals. This second camera takes freeze-frame shots of the graphics and sends them across the video link to other monitors.

This graphics camera — which usually is suspended from the ceiling and points

A paper path like this can send reliability around the bend.



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THE STRAIGHT-PAPER-PATH,

down to the meeting room table — can be used to record notes so everyone can follow the meeting's progress.

The book's appendix contains several reproducible forms that would be helpful for any manager planning a videoconference. It includes a planning checklist that assists the coordinator in defining issues for discussion and possible action, and in assigning facilitator and leadership roles.

Another work sheet helps planners block out the video mode for each segment within the videoconference. The authors also included a template that can be used to draw up legible text graphics.

The book costs $70 and can be ordered by calling the publisher at (303) 797-3131.

Sturrock sets goals as head of EDI group

continued from page 25

development times by helping them to map information flows and define data requirements.

"These tools will allow X12 members to focus more of their time and energy on designing the functional aspects of standards instead of hashing out technical details," he said.

Sturrock said he hopes to incorporate these tools into the development process before his term ends in two years.

In addition to improving the development process, Sturrock said his main task is to balance the needs of a multiplicity of groups within X12 that often have competing and conflicting requirements.

In the past two years, X12 has incorporated a number of EDI standards that had been developed and maintained by independent groups in a variety of industries. X12 also participates in the development of international EDI standards.

"The X12 community is totally different than it was two or three years ago. It now has [multiple constituent groups] whose needs have to be served and balanced," Sturrock said.

One area of potential conflict exists between multinational firms that are eager to converge EDIFACT and X12, and the domestic firms that fear the move to EDIFACT will disrupt their implementation of X12. "Everyone recognizes the need for a global standard, but we don't know how to achieve that without affecting those firms who don't trade internationally," he said.

Sturrock also said that X12 will need to extend its relationships to a variety of industry groups outside of X12 that are assuming greater responsibility for determining exactly how companies within an industry will implement X12 standards.

"We have so many standards today and so many different ways of implementing them that industry groups will probably play a more important role in the next several years," Sturrock said. "X12 needs to make sure it is developing standards that can be used effectively by these groups."

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FLAT-OUT-RELIABLE IBM PPS II

Advancing requires ability to change

continued from page 25

to mid-level and, finally, to senior positions of management.

The very characteristics that contribute to success at one level can become impediments at the next.

For instance, technical skills are of paramount importance to a first-line telecommunications supervisor. This person must have a deep understanding of the technology that the staff is charged with researching, implementing and administering. The supervisor's technical experience and knowledge enable the manager to effectively guide the staff in carrying out assignments.

Casting off techie ties

Technical understanding can only take network managers so far. Too great a preoccupation with technical matters will hamstring a supervisor's efforts to rise any further in the management ranks. It is very disheartening to watch mid-level managers undermine their careers because they devote too much time to developing the wrong skill.

In the middle management range, the manager's view and responsibilities should take a dramatic shift away from comprehending the arcane aspects of the latest network products. Instead, managers should focus on tactical planning and corporate politics.

Mid-level managers have to concentrate on coordinating their group's activities with the rest of the organization. They need to translate overall corporate objectives into concrete network goals. They have to be hard-nosed negotiators and adept planners and administrators.

Most middle managers — despite distinguished performance — will never move into the executive ranks because they lack a solid understanding of all functions within the company. Many also don't have the vision to see where the company should be headed in the next five to 10 years, nor do they have the plans in place to get there.

Middle managers should no longer be concerned with putting together comprehensive automation plans and managing implementations. They should assume a greater role in providing leadership, inspiring people and generating enthusiasm, often through personal example.

Knowing which behaviors to emphasize during one's career journey will help network managers go as far up the corporate ladder as their innate talents can take them.

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GLOBAL NETWORKS

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World News

In a question and answer period following a speech at the Telecom 91 Exhibition and Forum in Geneva earlier this month, **Ellen Hancock,** IBM vice-president and general manager of communication systems, said that the computer maker plans to start a network outsourcing operation in Europe within six months that will be similar to the outsourcing unit IBM currently operates in the U.S.

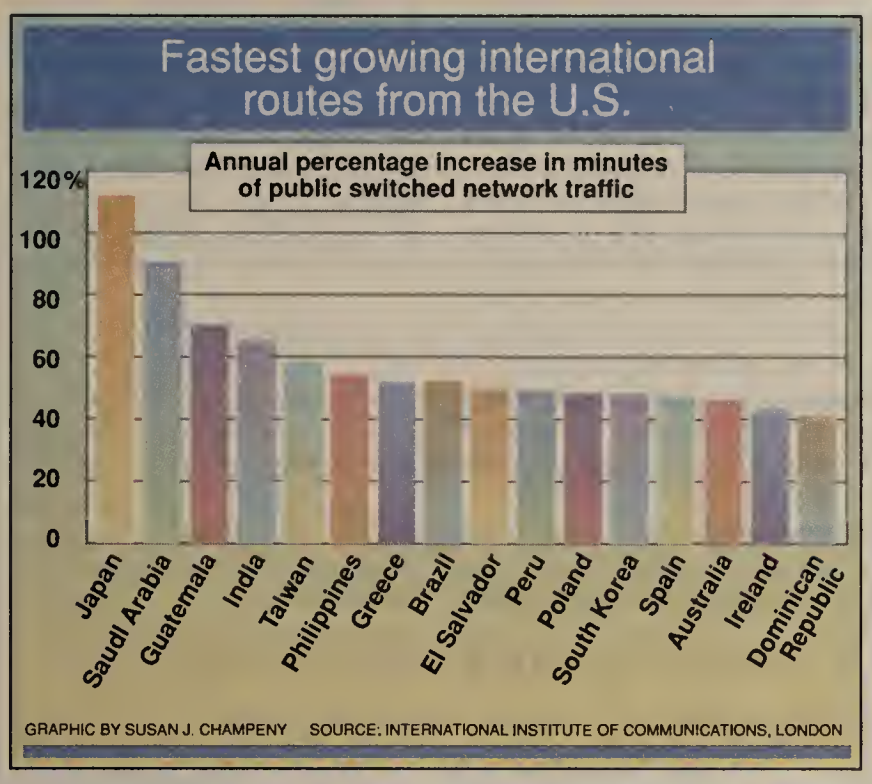
The new European outsourcing unit is expected to use network consulting resources from IBM's La Gaude, France, network laboratory. The La Gaude network consulting unit is called NetReview.

Also at Telecom 91, **US Sprint Communications Co.** said it has signed an agreement with Australia's international carrier, OTC, Ltd., to extend its Global Virtual Private Network Service (GVPN) to Australia.

Additionally, the Japanese carrier, International Digital Communications, Inc., said it plans to begin offering International Virtual Private Network service in 1992.

US Sprint officials said they expect International Digital Communications to eventually offer GVPN service in conjunction with US Sprint and Cable & Wireless PLC.

In its booth at Telecom 91, the Japanese carrier demonstrated several GVPN applications with US Sprint and Cable & Wireless, including videoconferencing, seven-digit dialing and net ring-again.



AT&T working to establish platform for Global SDN

Also mulls public switched services expansion.

By Barton Crockett
Senior Editor

GENEVA — AT&T is negotiating with carriers around the world to establish a common technical framework that would enable AT&T and foreign carriers to provide international virtual network services with similar features.

Agreement on a common technical platform would expand the capabilities of AT&T's Global Software-Defined Network (SDN) service and make the offering easier to use, said Raymond Butkus, AT&T's director of international business services, during a private interview at the recent Telecom 91 Exhibition and Forum here.

According to Butkus, AT&T is also considering offering public switched network services in foreign countries. "Clearly, we are looking at a range of options," he said. "Communications service within a [foreign] country is one of those."

Butkus is in charge of all of AT&T's international switched services, including Global SDN, International 800 Service and International Direct Dial Service.

Butkus said AT&T has been working with foreign carriers for more than a year to create a common technical platform for Global SDN, which would be critical to expanding its functionality.

Butkus said AT&T is in Phase 2 of a three-stage Global SDN rollout plan. In Phase 1, Global SDN was only a basic service that supported customized, seven-digit dialing plans.

In Phase 2, which started in May, AT&T began to support a feature that enables users to route calls over Global SDN using either customized seven-digit numbers or standard international calling numbers. The "forced"

(continued on page 64)

Private sector helps Africa improve nets

Governments encourage corporate participation in bringing better telecom nets to the continent.

Second of a two-part series examining network conditions throughout Africa.

By Vineeta Shetty
Special to Network World

Despite less than optimal network conditions across Africa, countries there have made progress over the last four years toward liberalizing telecommunications policies and, in some cases, allowing private sector participation.

Perhaps more timidly than governments on other continents, African governments are allowing private sector participation through joint ventures and subcontracting of installation and maintenance services with the aim to improve network conditions.

There have even been moves toward more advanced privatization, such as the sale of shares of state-run telephone operators to the public sector, as is the case in Zambia.

Telecommunications policy reforms have taken place in Benin, Botswana, Burkina Faso, Burundi, Central African Republic, Gambia, Ghana, Ivory Coast, Mali, Niger, Nigeria, Senegal, Tanzania, Togo and Zambia. Reform is also expected in Angola, Rwanda and Sudan.

The participation of the private sector in the provisioning of telecommunications and the entry of foreign suppliers has realigned priorities toward promoting economic, trade and industrial development.

One illustration of this phenomenon is Companhia Portuguese Radio Marconi (CPRM), which created an international division to search for and analyze new partnership opportunities at the international and national level. CPRM has effectively exploited Portugal's historic ties with its former colonies on the continent: Angola, Cape Verde, Guinea-Bissau, Mozambique, Principe and Sao Tome.

The company plays the role of investor and advisor to local telecommunications administrations. It has a 51% stake in Guine Telecom, the operator in Guinea-Bissau.

As one of the first private companies in Africa, Guine Telecom has made significant advances since it began operation in 1989 under CPRM's involvement, doubling the number of subscriber lines in the country to 7,000.

One of the most active foreign telecommunications operators has been France Telecom, which has lent a new market-oriented slant to the administrations of the French-speaking countries in the western and central regions of the continent.

Consolidation of its traditional operations in Africa in 1988 has been one of the main strategic lines defined by France Telecom's subsidiary, France Cable & Radio (FCR). Despite the continuing economic difficulties on the continent, Africa remains a prime operating zone for the company.

In Chad, France Telecom has stimulated the use of electronic telephone directory and videotex services. It also installs servers and specific applications in Morocco and Niger. The carrier is in-

(continued on page 30)

What it takes to be the international specialist. #4 in a series.

"Hometown Advantage."

—Stephan Folgnand
Managing Director,
Germany
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Private sector aids African nets

continued from page 29

volved in an operating assistance plan for a data transmission network in North Africa.

FCR lately has combined its operational expertise with Sofrecom's engineering talent to implement projects in Africa.

For instance, it participated in the installation of the International Telecommunications Satellite Organization Standard A earth stations in Gabon, provided engineering for switching and transmission networks in Niger and Mauritius, and delivered and operated a packet net in Egypt.

FCR has also been active in setting up local X.25 networks: Togopac in Togo, Chadpac in Chad, Senpac in Senegal, Nigerpac in Niger, Egyptnet in Egypt and Sytranpac in Ivory Coast.

The predominance of packet-switched networks in West Africa is due in part to the presence of foreign oil firms in the area that need access to remote locations and their home countries.

This decade ought to see a spurt in telecommunications activities across Africa. The World Bank is increasing official development assistance to the continent and is exhorting telecommunications entities to take on a more proactive role in emphasizing to their ministries of planning and finance the role of telecommunications in economic development.

Regional financing has also been increasing. The African Development Bank, for example, has financed several telecommunications projects in 30 countries.

Bilateral lending and technical assistance from Nordic countries and Japan indicate a shift is under way from Southeast Asia to the Middle East to Africa in project ratio.

For instance, in the case of Nippon Telecom Consulting Company, Ltd. (NTC), Malawi, Ghana and Zimbabwe account for 45% of NTC's revenues. But most of these projects have been in the area of basic voice services.

Although value-added services are critical as a boost to business activities and the economy as well as being profitable to the operator, proposals for services such as electronic mail and packet switching are not viewed favorably by potential financial backers.

> The predominance of packet-switched networks in West Africa is due in part to the presence of foreign oil firms in the area.
>
> ▲▲▲

Basic types of services involving improvements to the network are viewed in a more positive light.

Investors are also likely to direct more funds to the local and national network and deemphasize international services. In light of this, foreign and private companies play an increasingly important role in ensuring that profit-oriented, enhanced services become available.

Encouraging investments

Several African telecommunications administrations have even instituted reforms on their own that foretell progressive pricing and efficient management of the network.

Nitel of Nigeria is one example of an administration fostering the long-term view, having embarked on a program to encourage outside investors to buy company stock. Senegal also has a program for involving large users in its advanced new services. Sonatel, the company's service provider, recently installed a national packet-switched data communications network, which a group of 12 leading companies were closely involved in defining and launching.

Promising developments are also present in Ghana. AT&T International, Inc. and MCI Inter-

(continued on page 33)

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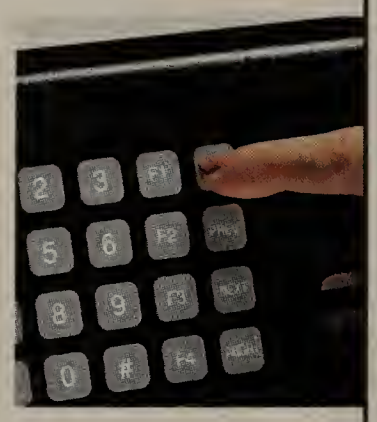

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First Look

Microcom unveils IBM mainframe gateway

Microcom, Inc. last week introduced a local-area network gateway product that can support as many as 253 simultaneous 3270 sessions with an IBM mainframe.

Relay Gateway is a board-level product for personal computers based on either the Industry Standard Architecture (ISA) or Micro Channel Architecture (MCA) bus and comes with the network version of Microcom's Relay Gold communications software.

Any DOS- or Windows-based personal computer configured with Relay Gold and linked to the gateway can establish a 3270 session with an IBM mainframe through a single physical connection. The workstations can be attached via any type of network, including token-ring, Ethernet or Arcnet.

On the mainframe link side, the gateway supports speeds up to 16M bit/sec when connected to hosts over token-ring connections, 128K bit/sec over remote dial-up or leased-line Synchronous Data Link Control connections, and 1.5M bit/sec via coaxial connections.

The coaxial connection supports only 40 simultaneous 3270 sessions.

The Relay Gold software enables workstations to support as many as 15 simultaneous sessions, of which five can be mainframe sessions through Relay Gateway.

Relay Gateway is currently available and pricing starts at $2,270, which includes an eight-user version of Relay Gold, the gateway software and an ISA board. Customers that already have Relay Gold installed can buy the gateway software and the board for $1,100.

Microcom, Inc., 500 River Ridge Drive, Norwood, Mass. 02062; (617) 551-1000.

Thomas-Conrad offers 100M bit/sec over copper

Thomas-Conrad Corp. recently unveiled a wiring hub and network adapters for its proprietary token-passing

(continued on page 32)

Bridge added to LAN hub mgmt. board

By Maureen Molloy
Staff Writer

SAN JOSE, Calif. — David Systems, Inc. recently announced at INTEROP 91 Fall here an Ethernet bridge for its intelligent wiring hub that is based on a modified version of its Supervisor module.

The ExpressNet Bridging Supervisor Module is a two-port spanning tree bridge based on the firm's existing ExpressBus Supervisor Module, which provides a single access point for net management of Ethernet, token-ring, Fiber Distributed Data Interface and other modules in an ExpressNet Concentrator hub.

The new module integrates bridging and network management functions on a single module, enabling users to add bridging functions without sacrificing interface chassis slots and reducing the number of twisted-pair ports available in the hub.

Management information on the Bridging Supervisor Module is accessed either through an RS-232 management interface on the module or in-band via the network using an MS-DOS/Microsoft Corp. Windows 3.0-based Simple Network Management Protocol (SNMP) management station.

The bridge uses a Motorola, Inc. 68020 processor. It filters packets at 28K packet/sec and has a packet forwarding speed of 14.8K packet/sec. Like the existing Supervisor Module, the supervisor and bridge combination features Management Information Base II. In addition, it supports the Spanning Tree Algorithm.

The bridge is SNMP-compatible and can be managed as a separate entity without needing a stand-alone bridge, the company said. The new module is expected to be available in December for $3,500. The existing module without bridging will still be available for $1,500.

In another announcement, David Systems said its SNMP management station was chosen by Digital Equipment Corp. as the basis for a management platform for DEC's low-end WorkGroup family of internetworking products.

While David Systems will work with DEC to develop the product, the resulting management station will be sold and serviced exclusively by DEC and its resellers.

For more information, contact David Systems at 701 E. Evelyn Ave., P.O. Box 3718, Sunnyvale, Calif. 94088; (408) 720-8000.

ACC adds local support to remote bridge/router

By Maureen Molloy
Staff Writer

SAN JOSE, Calif. — Advanced Computer Communications has unveiled network interface cards for its ACS 4200 multiprotocol remote bridge/router that will enable customers to configure the device as a local or remote bridge/router.

When one of the new local- and wide-area network interfaces is inserted into the 4200, new configuration software identifies the type of board that has been added and reconfigures the system accordingly.

The company's current 4200 bridge/router is configured solely as a remote bridge/router and supports one LAN and two WAN connections.

The new interface cards, recently unveiled here at INTEROP 91 Fall, include a single-port Ethernet board that supports both thin and thick coaxial cable, and a single-port token-ring card that can be adjusted to support 4M or 16M bit/sec token-ring LANs.

The third interface card is a WAN serial port that supports point-to-point, X.25 and frame relay links at speeds from 9.6K bit/sec to 1.544M bit/sec.

The upgraded 4200 will support the same protocols as the existing version, including the Transmission Control Protocol/Internet Protocol, Apple Computer, Inc.'s AppleTalk, Digital Equipment Corp.'s DECnet, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Xerox Corp.'s Xerox Network Systems. It will also support IBM's Source Routing protocol for Token-Ring Networks.

Prices for the ACS 4200 start at $7,500 for a stand-alone unit. The Ethernet card costs $500, and the token-ring card costs $1,000. The WAN card ranges in price between $500 and $1,500.

The new bridge/router and interface cards will be available in January.

For more information, contact ACC at 720 Santa Barbara St., Santa Barbara, Calif. 93101, or call (805) 963-9431.

Token-Ring products link SPARCstations

Enable Sun devices to communicate over ring networks and to access hosts, other devices.

By Joanne Cummings
Staff Writer

CAMBRIDGE, Mass. — Brixton Systems, Inc. recently announced a product that enables Sun Microsystems, Inc. SPARCstations to communicate with one another as well as other devices and IBM mainframes over an IBM Token-Ring local-area network.

The product, which includes software modules and a 4M bit/sec Token-Ring card, allows SPARCstations to access IBM mainframes via a Token-Ring LAN using Systems Network Architecture. It also lets SPARCstations communicate with Transmission Control Protocol/Internet Protocol-based devices over a Token-Ring backbone net.

The mainframe communications software, called BrxTR/SNA, includes the BrxPU2 SNA Server module, software that supports the physical connection of the SPARCstation to the Token-Ring Network. Once linked, the SPARCstation can initiate a session with an IBM mainframe via a Token-Ring-attached IBM 3745 front-end processor or 3174 cluster controller.

The software supports SNA protocols and uses the IEEE 802.2 Logical Link Control (LLC) protocol to permit passage of data between systems on both local and remote Token-Ring Nets.

BrxTR/IP uses the Sub-Network Access Protocol and LLC to pass data.

▲▲▲

Brx3270 lets the SPARCstation emulate an IBM 3270 terminal.

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A SPARCstation configured with BrxTR/SNA and BrxPU2 SNA Server can act as a gateway for other SPARCstations linked via a TCP/IP Ethernet network. The product can support eight sessions, meaning as many as eight workstations can use the SPARCstation as a gateway to the Token-Ring Net. Users can purchase additional 16-session support increments for $500 each.

Brixton Systems offers several software programs that work with BrxPU2 SNA Server to provide access to IBM mainframe applications such as JES2, TSO, IMS, CICS and NetView. These include:

- Brx3770, which lets the Token-Ring-attached SPARCstation emulate an IBM 3770 terminal.
- Brx3270, which lets the SPARCstation emulate an IBM 3270 terminal.
- BrxNMI, which enables the SPARCstation to communicate directly with IBM's NetView network management system.
- And BrxSNM, which allows Sun's SunNet Manager network management system to communicate with IBM's NetView. BrxSNM permits the two net management programs to comanage the network, enabling them both to act on Simple Network Management Protocol objects.

Another part of the package, the BrxTR/IP router, is software that resides in a SPARCstation configured as a gateway with BrxTR/SNA and BrxPU2 SNA Server. It allows SPARCstations, Digital Equipment Corp. terminals and Hewlett-Packard Co. workstations on a TCP/IP-based LAN to access other TCP/IP-based devices over a Token-Ring backbone.

BrxTR/IP uses the Sub-Network Access Protocol and LLC to pass data to local and remote systems, enabling applications such as Network File System, file transfer, electronic mail and remote logon to operate transparently over the Token-Ring.

The entire package, including BrxTR/SNA, BrxPU2 SNA Server, BrxTR/IP and the Token-Ring card, is available now and is priced at $995. The Brx3270, Brx3770, BrxNMI and BrxSNM software modules are available separately for $1,950 each.

For more information, contact Brixton Systems at 185 Alewife Brook Pkwy., Suite 4200, Cambridge, Mass. 02138, or call (617) 497-2938.

First Look

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TCNS product line that support speeds of 100M bit/sec over a mix of media, including shielded twisted-pair wiring.

The new **TCNS Smart Hub** comes in four models: The TC3050-CX offers eight coaxial ports; the TC3050-STP has eight shielded twisted-pair ports; the TC3050-CX/ST has six coaxial and two fiber-optic ports; and the TC3050-STP/ST offers six shielded twisted-pair and two fiber ports.

The hub models, which are available now, range in price from $1,995 for the TC3050-CX to $2,295 for the TC3050-STP/ST.

The company also introduced two TCNS adapters for use in any IBM Personal Computer AT. The **TC3045-CX** is a 16-bit coaxial adapter, and the **TC3045-STP** is a 16-bit unshielded twisted-pair adapter.

The adapters will be available by year end and are priced at $745 each.

TCNS networks are configured in a distributed star topology and support a maximum of 255 nodes per network. The net operates with standard and accelerated Arcnet drivers and offers interoperability with Fiber Distributed Data Interface, Ethernet, token-ring and Arcnet nets at the network layer of the Open Systems Interconnection model.

Thomas-Conrad Corp., 1908-R Kramer Lane, Austin, Texas 78758; (512) 836-1935.

Firm introduces inexpensive Ethernet-compatible LAN

Tutankhamon Electronics, Inc. recently introduced a low-cost local-area network that can link Ethernet-compatible equipment over ordinary telephone wire. **MagicNet** consists of a wiring hub and connection devices.

The **MagicNet Hub** is a stand-alone device available with four or eight ports. Each port can support, via unshielded twisted-pair wire, a **MagicNet Assistant Network Manager** at distances as far as 400 feet. Each Assistant Network Manager, in turn, can support as many as 30 devices daisy-chained using coaxial cable and standard Ethernet interface cards.

A fully utilized eight-port MagicNet Hub, which lists for $895, can support as many as 240 Ethernet devices using only eight lengths of phone wire and eight Assistant Network Managers, which are priced at $99 each. This totals $7.03 per connection, the company said, compared with a traditional 240-node 10Base-T Ethernet LAN, which costs $100 per connection.

MagicNet, which is fully compatible with all Ethernets using IEEE 802.3 carrier-sense multiple access with collision detection, is available now. A four-port MagicNet Hub costs $475.

Tutankhamon Electronics, Inc., 2446 Estand Way, Pleasant Hill, Calif. 94523; (510) 682-6510.

Attachmate enhances EXTRA! for Windows software

Attachmate Corp. last week announced a new version of its EXTRA! for Windows software that includes simplified Dynamic Data Exchange (DDE) access, A Programming Language (APL) character display, light-pen support, command-line file transfer and diagnostic trace facilities.

EXTRA! for Windows 3.3, like the previous version of the product, is personal computer-to-mainframe communications software that resides on a personal computer running Microsoft Corp. Windows 3.0.

The new, simplified DDE facility makes it much easier to create automated information links between the mainframe and Windows applications. For example, from within a DDE application such as Microsoft's Word for Windows or Excel, users can call previously defined macros within EXTRA! for Windows. The macros can be used to automate most host interactions, such as logging on, retrieving electronic mail and invoking file transfer.

Attachmate also added APL character support to the product. APL applications, which are utilized by financial and statistical analysis users, contain several characters that are not part of the standard ASCII character set. Previously, APL applications required special handling at the personal computer, according to the company.

Another new feature is Mouse-Pen support. This enables users to employ the mouse as a light pen and make selections by pointing the mouse at objects on the screen.

The company also added command-line file transfer. Although Windows' menus and dialog boxes make file transfer easier, some experienced users prefer the command-line syntax from DOS, Attachmate said. With the enhancement, the product now supports either method of file transfer.

Finally, the firm has added a diagnostic trace facility that enables users to record communications events on the network. These traces can later be analyzed by Attachmate's technical support teams to pinpoint any communications problems, the company said.

EXTRA! for Windows is available now and is priced at $425. Upgrades from previous versions of EXTRA! cost $75 and are free to Attachmate Central Support customers.

Attachmate Corp., 13231 S.E. 36th St., Bellevue, Wash. 98006; (206) 644-4010.

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Cisco announces multiprotocol bridge/router for token-ring nets

By Maureen Molloy
Staff Writer

MENLO PARK, Calif. — Cisco Systems, Inc. recently introduced a multiprotocol remote bridge/router for token-ring networks.

The new IGS-TR is based on the same platform as the company's existing IGS bridge/router, which currently supports Ethernet traffic only. It is a single-board device that contains one token-ring port and one wide-area port that can support transmission speeds up to 4M bit/sec.

The device, which can be configured to support 4M or 16M bit/sec token-ring local-area networks, is based on a 20-MHz Motorola, Inc. MC 68030 processor with 1.5M bytes of system memory, eight 32-pin sockets for IGS software read-only memory chips and 16K bytes of memory for network configuration information storage.

The IGS-TR will support the same protocols as Cisco's existing bridge/routers, including Apple Computer, Inc.'s AppleTalk, Banyan Systems, Inc.'s VINES, Digital Equipment Corp.'s DECnet, Novell, Inc.'s Internet Packet Exchange (IPX), Xerox Corp.'s Xerox Network Systems, the Transmission Control Protocol/Internet Protocol and Open Systems Interconnection protocols.

It will also support the same bridging algorithms, such as Source Routing, and the same routing protocols, including the Routing Information Protocol, Open Shortest Path First and Cisco's proprietary Interior Gateway Routing Protocol.

The board's token-ring interface uses Texas Instruments, Inc.'s TMS38016 Commprocessor token-ring chipset, which executes the FASTMAC software that Cisco began licensing last year from Madge Networks, Inc. FASTMAC is a data-buffering and data-transfer program that enhances the chipset's performance.

The IGS-TR would typically be used to connect small remote offices to another higher end bridge/router at a company's headquarters via leased lines, X.25, frame relay or Switched Multimegabit Data Service (SMDS), the company said.

The IGS-TR costs $6,995 and is expected to be available in January. Options include concurrent bridging software for $450 and packet-switch software to support X.25, frame relay and SMDS for $750.

For more information, contact Cisco at 1525 O'Brien Drive, Menlo Park, Calif. 94025, or call (415) 326-1941.

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transatlantic fiber optic cable completed. 1990 *Sprint announces the first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

Privatization helps Africans

continued from page 30

national, Inc. have created new accounting arrangements in order to stimulate traffic. AT&T provides and installs digital compression equipment for the link between a satellite earth station and the international exchange in Accra, Ghana's capital. Instead of currency, the post, telegraph and telephone administration pays AT&T via an adjustment in tariffs.

Other PTTs are attracted to this scheme because it makes their invested plant more productive. This year, AT&T plans to focus on several countries where the revenue stream has the most potential, such as Nigeria, Ghana, Kenya and, possibly, Gambia. The companies have been prioritized by call completion rates and have been selected for their geographic situation.

Focus on the network

International carriers such as AT&T are putting pressure on telecommunications administrations to focus attention on the network rather than adding local loops. The case of Gambia highlights the benefits of improving the network infrastructure. Gamtel increased its call completion rate significantly and now has an international call completion rate that is 20% higher than the average found in West African nations.

Administrations are recognizing that this could be a competitive difference in attracting trade opportunities and business from foreign companies.

Currently, the trend is to distinguish development efforts in each economic and social growth sector. The national operator is responsible for providing vital telecommunications needs.

Telecommunications can be expected to play an increasingly important role with the creation of the African Economic Community in the year 2000. Throughout Africa, there is an increasing awareness that those countries that delay in implementing new telecommunications structures stand to lose important multinational user clients that would eventually enable the operators to place themselves in a competitive position.

As a result, multinational users of Africa's telecommunications networks have the opportunity to place themselves strategically in a consultative role to telecommunications administrations and influence important long-term decisions.

Shetty is an independent researcher and writer on global telecommunications based in London.

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OPINIONS

MANAGEMENT ISSUES

BY JAMES BAILIE

Net managers shouldn't restrict 900 number access

Telecommunications managers should rethink their approach in denying employees access to 900 numbers from the office since a growing number of legitimate business applications are now using 900 numbers as a platform.

Because of the dubious business value of most 900 and 976 services in the past, it's understandable that telecommunications managers restricted private branch exchange access to such numbers. But today, more and more legitimate business services are becoming available via 900 service, such as a customer support line that uses a 900 number at $1 per minute. Under this strategy, customer support is priced on an as-consumed basis, rather than as a fixed-price service contract.

A growing number of legitimate business applications are now using 900 numbers.

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If network managers continue to restrict PBX access to 900 numbers, these win-win service ideas will be obstructed. Allowing 900 access on a case-by-case or line-by-line basis can lead to headaches that most telecommunications managers would prefer to avoid. Instead, telecommunications managers really need to reexamine the underlying rationale for any form of 900 restriction.

The 900 arena will eventually evolve to provide a wide range of service offerings — some legitimate, others a waste. But this statement is true of virtually any product in any field of business. Is the telecommunications manager responsible for stopping fraud or employee waste? Fraud certainly must be contained and involves primarily unauthorized access and use of the company's PBX, which is not unique to the 900 issue.

That issue really involves employee discretion, a decision that should not rest on a telecommunications manager's shoulders any more than travel expenses, long-distance calling, office supplies or a thousand other discretionary items. Those issues should be handled solely by the employee and the employee's manager.

Censorship is not a pleasant charge. A telecommunications professional does not want to be inadvertently accused of it. If the 900 industry offers legitimate business services, employees should be able to use them when applicable. If employees abuse 900 services, the response from their managers should be identical to similar indiscretions for misusing company resources.

There is a simple three-part formula for addressing the 900 issue. First, accept that while many 900 services are a ridiculous waste of money, there are a growing number of legitimate business services. Therefore, general access to 900 services from within the PBX is necessary.

Second, advise upper management about the new world of 900 services. In this world, your company has a role not only as a consumer, but also as a potential provider. For example, your company's products require telephone support services — a cost burden to your company. By using 900 numbers, those services can become self-funding.

Third, make sure departmental managers understand that preventing 900 service abuse is everyone's duty. It's not just a telecommunications responsibility. With the exception of the telephones located in public areas, such as hotel lobbies, which are justifiably restricted from long-distance services, 900 access should be allowed in the PBX environment.

Bailie is an independent consultant based in Bethesda, Md. He can be reached at (301) 564-5965.

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EDITORIAL

LAN managers need to implement security measures

Threats to network security have gotten much worse recently, so we strongly advise network managers to consider strengthening their security measures. If you don't have a security plan in place, now is a good time to draft one.

The threat of viruses to networks is particularly severe. With local-area networks being linked together and taking on more mission-critical applications, a single virus attack could do severe damage to corporate information systems.

Here are a some facts to consider: In June, *Network World's* Critical Issues Survey showed 32% of users had been hit by viruses during the previous 12 months ("Survey: Drawing a bead on net managers' top concerns," *NW,* June 3). A more recent survey conducted by *Network World* for the Communications Managers Association found 55% of its members had virus attacks over the previous 12 months ("CMA '91 survey spotlights technology, mgmt. issues," *NW,* Oct. 14).

David Stang, director of the National Computer Security Association, predicts an average of six new viruses will be created each day during 1991. And a virus specially created to attack Novell, Inc.'s NetWare operating system has been discovered.

Clearly, protective measures are called for. But with corporate budgets constrained, network managers may not find upper management interested in the subject. *Network World* reported last month that many managers find it difficult to obtain funding for security projects.

But net managers should start reeducating their bosses because it will be difficult to make LANs the platforms for strategic applications if there is a climate of fear about the integrity of the data stored on them.

This week's issue of *Network World* contains two articles on this subject: a general guide to drawing up a security program for LANs ("Evaluating LAN security," page 47) and the first article describing the *Network World*/National Computer Security Association Network Security Test Series ("Good virus protection comes cheap, test shows," page 1).

The test is particularly notable. It put 11 popular virus removal tools on a test bed and showed that their effectiveness varies widely.

Security is a high-priority concern, and *Network World* will continue to take a leadership role in covering security issues. But the bottom line is the action taken to ensure security. Top management may not want to pay for security but will hold network executives responsible when problems arise.

OPINIONS

MACROSCOPE

BY JAMES KOBIELUS

Building a network software distribution architecture

In future networks, software installations and upgrades will be transparent to users, implemented through silent downloads from special software servers that perform all technical reconfiguration and testing in the background. Diskette toting will be a thing of the past. With minimal human intervention, software will plug itself into hardware throughout the network and notify users automatically when a new service is ready and waiting.

In preparation for this, network managers should begin to implement automated software distribution. To do this, they can use approaches and tools already in existence. What is needed is an overall network software distribution architecture that consists of the following elements:

■ **Dynamic inventory tracking.** Network managers must maintain a dynamic inventory of installed network hardware and software components as well as their locations, functions, vendors, versions and other attributes. Configuration tracking can be automated through polling from a central network management station to agents collocated with each managed hardware or software resource.

The network inventory — often referred to as a management information base — should support both high-level network topologies as well as low-level maps and profiles of each networked resource.

■ **Version control and configuration management.** Managers should enforce strict rules defining permissible software versions, directory structures and memory management schemes. Standards ensure that the same software is located in the same logical location on diverse machines, thereby simplifying bulk upgrades, maintenance and troubleshooting.

■ **Software servers.** Bulk software upgrades can be accomplished quickly, efficiently and consistently if program files are downloaded through automated transfers from central or distributed software servers. Logistically, the software server approach makes more sense than the usual corporate practice of stocking 10,000 physical copies of a program, each of which must be independently distributed and installed. Of course, net managers who take this approach must be careful not to violate software license deals.

> Network managers should begin to implement automated software distribution.
>
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■ **Remote installation and testing.** Once downloaded, program files can be installed and tested on target machines by remote control from system administrators. Automated routines would speed installation on groups of machines with similar hardware/software configurations.

Software installation could be performed after hours to minimize impact on users. Or, to the extent that servers and workstations run multitasking operating systems, these administrative chores can be carried out in the background during typical network operations.

■ **Security.** Without strong safeguards, a server-directed software distribution approach would increase network vulnerability to hackers and viruses. To prevent this, companies would have to implement stringent authorization, authentication and virus monitoring systems that could not be altered, overwritten or bypassed from the software servers.

■ **License metering and augmentation.** Network managers can install metering software on departmental servers to enforce compliance with concurrent user license restrictions for commercial network applications. Metering systems could also provide usage statistics needed to identify when new site licenses should be acquired or existing licenses augmented to include more users.

The license application process could be automated through electronic data interchange between software servers and software vendors. Upon receiving additional site licenses, servers would have the go-ahead to begin generating and distributing more copies from their program inventories.

■ **User notification.** Finally, the software distribution system must have integrated messaging to notify users of software upgrades, new services and capabilities. Mere updates to net menus are insufficient, as are the scrolling messages that most users see — and ignore — when they log onto the network or access their electronic mail. Commercial software publishers go to great lengths to advertise their new products, so why shouldn't network managers do the same when they release new software internally?

Firms have every incentive to begin automating the software distribution process. Every hour an employee is freed from the drudgery of installing applications is an hour that can be devoted to more strategic uses, such as application planning and design. Every moment a company gains through speedier application deployment may translate into better customer service, more flexible corporate response and increased market share.

Kobielus, a contributing editor to Network World, *is a telecommunications analyst with Fairfax, Va.-based Network Management, Inc., one of the largest local-area and wide-area network systems integrators in the U.S.*

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TELETOONS

BY FRANK AND TROISE

LETTERS

To copy or not to copy

I disagree with four points made in the recent opinion column "Congress needs to reexamine copyright law" (*NW,* Sept. 16), which dealt with CDROM technology.

The first issue the column addressed was accessing the CDROM. There should be little question that calling the data up to memory and then to the screen would constitute fair use; otherwise, the product is not usable.

Second, if someone selects material from a CDROM and copies it to disk or prints it, it would appear that this also would constitute fair use, similar to copying pages from a book.

Third, I disagree that copying or viewing material over a local-area network fits the definition of a public performance. If it does, then all of the libraries in the free world are in violation of the copyright act. It is a familiar and regular practice of companies to collect information into libraries for the use of their employees. Any seller of a CDROM that believes its product should not be used in this way will go out of business.

Fourth, the software that allows you to access the material contained on a CDROM disk is obviously a computer program. However, the material on a CDROM should not reasonably be considered a computer program because the CDROM simply contains information, not an active program.

In my opinion, the article either misrepresents copyright law or was written specifically to roadblock the use of CDROM technology.

D.F. Persells
Executive vice-president
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Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

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BUYER'S GUIDE

SUPERSERVERS

Souped-up servers

Most of today's local-area network file servers are just high-end personal computers that are architecturally identical to the desktop machines they serve.

However, for demanding applications, such as large or intensively used multiuser databases, users now have the option of installing a computer that was born to serve: a superserver.

Superservers generally have the following two characteristics: First, they are based on off-the-shelf microprocessors, such as Intel Corp. 80x86, Motorola, Inc. 680x0 or Sun Microsystems, Inc. SPARC processors. Second, in business environments, superservers are used exclusively as LAN servers or multiuser hosts because they support features that go beyond those of a stand-alone personal computer or personal computer-based server.

For instance, most superservers support multiple processors, while personal computers are usually limited to a single processor. Similarly, superservers often allow multiple network cards to

(continued on page 46)

Hurwicz is a free-lance writer and local-area network consultant based in Eastsound, Wash.

CHART • GUIDE

A Buyer's Guide chart comparing superservers begins on page 44.

Superservers offer users the speed, processing power and storage capacity that traditional file servers can't provide.

By MICHAEL HURWICZ

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Superservers (continued)

Company	Product	Standard configuration	Processors/ Multiprocessing strategy	Maximum disk storage	Maximum main memory	Network interfaces	Reliability features	System bus type and number	Network software	Bus slots	Price (standard configuration)
Advanced Logic Research, Inc. Irvine, Calif. (714) 581-6770	Powerpro Array	1 50-MHz i486 processor; 17M bytes of RAM; 512K bytes of SMP cache; bit-block transfer super VGA adapter; 4 340M-byte integrated drive electronics drives; 1 5¼-in. 1.2M-byte floppy disk drive; 2 serial ports; 1 parallel port; 1 mouse port; 9 drive bays	1 to 2 50-MHz i486 processors/Symmetric	1.3G bytes	49M bytes	Third-party ISA and EISA	Disk mirroring, disk striping, disk spanning	1 EISA	Off-the-shelf Novell, Inc., NetWare; The Santa Cruz Operation, Inc. SCO MPX; OS/2; Banyan Systems, Inc. VINES SMP	2 16-bit ISA, 8 32-bit EISA, 2 32-bit proprietary for CPU and cache memory	$23,999
American Mitac Corp. San Jose, Calif. (800) 648-2287	Mitac 4280G/MP	1 33-MHz i486 processor, 16M bytes of RAM; 330M-byte hard disk drive; 1 1.44M-byte floppy disk drive; 1 1.2M-byte floppy disk drive; VGA monitor	1 to 4 33-MHz i486 processors; 1 25-MHz 386 processor per SCSI controller on C bus/Symmetric	Approximately 18G bytes	64M bytes	Third-party EISA	Redundant I/O and CPU, optional disk array	1 EISA, 1 C bus	Unix for multiprocessing, single-processor NetWare, VINES	2 C bus, 4 EISA or C bus, 4 EISA	$16,999
AT&T Computer Systems Morristown, N.J. (800) 247-1212	StarServer E	1 33-MHz i486 processor; 32M bytes of RAM; 1G byte of disk storage; 1 3½-in. 1.44M-byte floppy disk drive; 320M- to 525M-byte QIC cartridge tape	1 to 4 33-MHz i486 processors/Symmetric	48G bytes	512M byte	Ethernet, token ring, FDDI, Starlan 1, Starlan 10, third-party interface	Mapping out failing memory and processing elements, mirrored servers	2 proprietary system buses, 1 EISA bus	AT&T Unix System V Release 4.01; AT&T StarGroup LAN Manager; NetWare; Novell Portable NetWare; VINES; VINES MP	5-system bus slots for processor boards and memory boards, 12 EISA bus master slots	$46,500; additional processors: $14,900
Auspex Systems, Inc. Santa Clara, Calif. (408) 492-0900	NS3000 NetServer	16M bytes of RAM, 2 Ethernet ports; 1G byte of disk storage; 1 Motorola, Inc. 68020 or Sun Microsystems, Inc. SPARC host processor	1 68020 or SPARC host processor; 1 to 4 68020 Ethernet processors; 1 to 2 68020 file processors; 1 to 3 68020 storage processors/ Functional	10G bytes	96M bytes of primary memory; 68M bytes on SPARC host processor; 8M bytes on 68020 host processor; 1.5M bytes on each Ethernet processor; 4.25M bytes on each file processor; 250K bytes on each storage processor	Ethernet	Mirrored partitions with spanning, striping and mirroring, slide-mountable power supplies and VME boards, hot pluggable SCSI devices	Enhanced VME system bus	Unix, TCP/IP	6 out of 8 VME slots used: 1 for host processor and memory, 2 for Ethernet processors, 1 for file processor, 1 for storage processor, 1 for primary memory	$89,900 with 68020 host processor; $99,900 with SPARC host processor
Compaq Computer Corp. Houston (713) 370-0670	SystemPro	840M bytes of disk storage, 4M bytes of RAM, 8 32-bit slots	1 to 2 33-MHz i386 or i486 processors/Symmetric	19.8G bytes	4M to 256M bytes	Third-party interface	Disk mirroring, disk striping, data guarding	1 EISA	NetWare, IBM LAN Manager, VINES MP, Unix SMP	11 32-bit slots: 2 for RAM, 1 memory or system processor, 1 system processor, 6 available EISA slots, 1 EISA for 32-bit drive array controller	$17,999
Digital Equipment Corp. Maynard, Mass. (800) 343-4040	DEC 433MP	1 33-MHz i486 processor; 1.44M-byte floppy disk drive; 200M-byte disk storage; 8M bytes of memory	1 to 6 33-MHz i486 processors/Symmetric	418M bytes	64M bytes	Ethernet	Error-checking code	1 Corollary, Inc. C bus, 1 ISA bus	SCO Unix, DECnet, TCP/IP	8 slots on system bus for CPUs or memory, 7 EISA slots on I/O bus	$18,395
Epoch Systems, Inc. Westborough, Mass. (508) 836-4300	Epoch I Infinite Storage Server	HP 606B Erasable Optical Library Unit; 2 1.2G-byte magnetic disk drives; 1 Exabyte Corp. EXB8200 8mm tape drive; data station controller (CPU board); 2 SCSI ports; 2 Ethernet ports	2 25-MHz 68020 processors/Functional	Approximately 1T byte	8M to 24M bytes	Ethernet	Epoch's HyperSave for warm backup of optical media	1 proprietary bus	Unix	4 slots, used for disks and tape unit	$93,900
NCR Corp. Multi-User Products Division Dayton, Ohio (513) 445-5000	NCR System 3600	2 application processors; 8 AMPs; 2 copies of Unix Version 4.0; 2 copies of COBOL; 2 copies of database server software; 2 copies of database management software; 1 copy of utilities software; high-availability system monitor; 2 disk subsystems; 20 disks; 10 cables; 2 Ethernet controllers; 1 multiprotocol communications adapter; 28 UPSs; 1 administrative workstation	6 to 288 50-MHz i486 application processors or 33-MHz i486 AMPs/Symmetric	499.2G bytes	512M bytes per application processors (maximum of 32 application processors), 16M bytes per AMP (maximum of 32 AMPs)	Ethernet, token ring	Redundant high-speed intelligent interconnect, power supplies	1 MCA-E	AT&T LAN Manager for Unix, NFS	8 MCA slots per application processor	$1,470,460
	NCR System 3550	NCR Unix System V Release 4 (8 users); 4 processors; 128M bytes of memory; 1 Ethernet controller; 525M-byte tape drive; 1.3G bytes of disk storage; 1.3G-byte digital audio tape drive	2 to 8 50-MHz i486 main processors; 2 to 16 NCR 53C700 RISC SCSI processors/Symmetric	136G bytes	525M bytes	Ethernet, token ring	Redundant disks, SCSI controllers, power supplies, power failure recovery, disk mirroring	Proprietary dual 32-bit processor memory bus, MCA-E I/O bus	NFS, LAN Manager for Unix, NCR Portable NetWare	4 processor and 2 memory slots on the proprietary bus; 16 MCA-E I/O slots	$429,704
	NCR System 3450	NCR Unix SRV4 MP (8 users); 2 processors; 32M bytes memory; 1 token-ring controller; 1 Ethernet controller; 525M-byte tape drive; 2.8G bytes disk storage	1 to 4 50-MHz i486 main processors; 2 to 16 NCR 53C710 RISC SCSI processors/Symmetric	31.5G bytes	256M bytes	Ethernet, token ring	Internal UPS, system state automatic save and restore	Proprietary dual-32-bit memory bus; MCA-E I/O bus	NFS, Microsoft Corp. LAN Manager/X, NCR NetWare/X	4 processor and 4 memory slots on the proprietary bus; 8 MCA-E I/O slots	$69,785
NetFRAME Systems, Inc. Milpitas, Calif. (800) 852-3726	NF400	16M bytes of memory; 380M bytes of disk storage; 1 i376 I/O processor, Ethernet or token ring; 1 25-MHz i486 application processor	1 25-MHz i486 system processor; 0 to 7 25-MHz i486 application processors; 1 to 8 i376 (386SX equivalent) I/O processors; (up to 8 total application and I/O processors)/ Asymmetric	89.6G bytes	64M bytes	Ethernet, token ring	Redundant power modules, automatic retry/restart on error, data path parity checking	1 propnetary system bus, 1 proprietary I/O bus per I/O module	NetWare, OS/2, LAN Manager, IBM LAN Server	4 propnetary memory slots; 8 proprietary expansion slots	$45,000

AMP = Access module processors
EISA = Extended Industry Standard Architecture
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MCA = Micro Channel Architecture
MPX = Multiprocessing Extensions
NFS = Network File System
RISC = Reduced Instruction Set Computer
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SMP = Symmetric multiprocessing
SPARC = Scalable processor architecture
UPS = Uninterruptible power supply
VGA = Video graphics array

This chart contains a representative selection of superservers. Other vendors not included may offer comparable products.

SOURCE: MICHAEL HURWICZ, EASTSOUND, WASH

Superservers

Company	Product	Standard configuration	Processors/ Multiprocessing strategy	Maximum disk storage	Maximum main memory	Network interfaces	Reliability features	System bus type and number	Network software	Bus slots	Price (standard configuration)
NetFRAME (continued)	NF300	8M bytes of memory; 380M bytes of disk storage; 1 i376 I/O processor, Ethernet or token ring; 1 25-MHz i486 application processor	1 25-MHz i386 system processor; 0 to 4 25-MHz i486 application processors; 1 to 5 i376 (386SX equivalent) I/O processors (up to 8 total application and I/O processors)/ Asymmetric	89.6G bytes	64M bytes	Ethernet, token ring	Redundant power modules, automatic retry/restart on error, data path parity checking	1 proprietary system bus, 1 proprietary bus per I/O module	NetWare, OS/2, LAN Manager, LAN Server	4 proprietary memory slots; 5 proprietary expansion slots	$35,000
	NF200	16M bytes of memory; 380M bytes of disk storage; 1 i376 I/O processor, Ethernet or token ring; 1 25-MHz i486 application processor	1 25-MHz i486 system processor; 0 to 2 25-MHz i486 application processors; 1 to 3 i376 (386SX equivalent) I/O processors (up to 3 total application and I/O processors)/ Asymmetric	102G bytes	64M bytes	Ethernet, token ring	Redundant power modules, automatic retry/restart on error, data path parity checking	1 proprietary system bus, 1 proprietary bus per I/O module	NetWare, OS/2, LAN Manager, LAN Server	2 proprietary memory slots; 5 proprietary expansion slots	$45,000
	NF100ES	16M bytes of memory; 380M bytes of disk storage; 1 i376 I/O processor, Ethernet or token ring; 1 25-MHz i386 system processor	1 25-MHz i386 system processor; 0 to 2 25-MHz i486 application processors; 1 to 3 i376 (386SX equivalent) I/O processors (up to 3 total application and I/O processors)/ Asymmetric	102G bytes	64M bytes	Ethernet, token ring	Redundant power modules, automatic retry/restart on error, data path parity checking	1 proprietary system bus, 1 proprietary bus per I/O module	NetWare, OS/2, LAN Manager, LAN Server	2 proprietary memory slots; 3 proprietary expansion slots	$12,950
The Network Connection, Inc. Alpharetta, Ga. (800) 327-4853	Tnumph TNX	1 33-MHz 486 processor; 2 serial and 2 parallel ports; 5¼-in. and 3½-in. floppy disk drives; 450-watt power supply; keyboard; 14-in. monochrome monitor; 8 EISA expansion slots; DOS 4.01; 8M bytes of memory; 300M bytes of disk storage	1 33-MHz i386 or i486 processor/ Asymmetric (Motorola 68000 on Triumph Disk Coprocessor Board)	4.8G bytes	64M bytes	Third-party ISA for 386 machine or third-party ISA or EISA for 486 machine	Triumph Disk Coprocessor Board supports bad block reallocation and mirroring	1 ISA or 1 EISA	Off-the-shelf NetWare, VINES, LAN Manager, Unix	386 Version has 1 32-bit slot for memory only, 1 8-bit slot, 6 16-bit slots; 486 Version has 8 or 10 EISA slots	$11,450; for 10-slot bus, add $2,500
Parallan Computer, Inc. Mountain View, Calif. (415) 960-0288	Server 290 Series II Model 15	1 33-MHz i486 system processor; 8M bytes of RAM; 426M bytes disk storage; 2 SCSI II channels; 12 MCA slots; 1 1.44M-byte floppy disk drive	5 to 8 33-MHz i486 system processors; 2 NCR 53C700 SCSI controllers; Advanced Micro Devices, Inc. 2901 Intelligent Memory Mover/Functional	33.6G bytes	128M bytes	Third-party MCA, Ethernet, token ring, FDDI	Redundant system processors, MCA buses and adapters, SCSI channels, buses and controllers, power supplies, memory banks and controllers, automatic reboot/configure on system error	MCA-II; proprietary memory bus	OS/2, LAN Manager, LAN Server	12 MCA for network and application-specific adapters; 6 interprocess bus slots for system processor, SCSI I/O processors and memory	$24,900
	Server 290 Series II Model 65	1 50-MHz i486 system processor; 128M bytes of RAM; 19.2G bytes of disk storage; 4 SCSI II channels; 12 MCA slots; 1 1.44M-byte floppy disk drive	5 to 8 50-MHz i486 system processors; 4 NCR 53C700 SCSI controllers; AMD 2901 Intelligent Memory Mover/Functional	33.6G bytes	128M bytes	Third-party MCA, Ethernet, token ring, FDDI	Redundant system processors; MCA buses and adapters; SCSI channels, buses and controllers; power supplies; memory banks and controllers; automatic reboot/configure on system error	MCA-II; proprietary memory bus	OS/2, LAN Manager, LAN Server	12 MCA for network and application-specific adapters; 6 interprocess bus slots for system processor, SCSI I/O processors and memory	$234,510
Solbourne Computer, Inc. Longmont, Colo. (303) 772-3400	Series 5 Model 5E/800	2 40-MHz SPARC processors; 32M bytes of memory; 860M bytes of disk storage	1 to 4 40-MHz SPARC processors/ Symmetric	20.64G bytes	640M bytes	Ethernet, other third-party interfaces	None	1 VMEbus, 1 Kbus	Unix	7 Kbus slots, 7 VME bus slots	$74,900
Tricord Systems, Inc. Plymouth, Minn. (612) 557-9005	Power-Frame Model 40/33C	1 33-MHz i486 processor; 8M bytes of memory; intelligent I/O processor disk controller; 385M bytes of disk storage; 12-drive cabinet	1 or 2 CPUs (25-MHz or 33-MHz i486 processors); 0 to 2 I/O processors (12.5-MHz or 16-MHz i386 processors)/i486s are symmetric; i386s are asymmetric	44G bytes	12M bytes	Ethernet, token ring, Thomas-Conrad Corp. Thomas Conrad Network System, ARCnet	Optional redundant power supply, disk channel, disk drive	1 EISA; 1 PowerBus	NetWare 386, LAN Manager and LAN Manager MP, VINES, SCO Unix and SCO MPX	7 EISA; 1 ISA; 5 PowerBus for central processors and I/O processors	$30,990
Unisys Corp. Blue Bell, Pa. (215) 986-4011	U6000/65 Model B	1 33-MHz i486 system processor; 340M bytes of disk storage; 16M bytes of memory; 4 serial ports; UPS port; 1 floppy disk drive; ¼-in. tape drive	1 to 5 33-MHz i486 processors/Symmetrical	More than 40G bytes	16M to 256M bytes	Ethernet, token ring	Redundant CPU, memory, disks	1 proprietary system bus; 1 EISA bus for I/O	Unix, TCP/IP, NFS, Portable NetWare, LAN Manager for Unix	8 EISA slots, 3 proprietary system bus slots	$33,550 for standard configuration; starts at $27,900
	U6000/75 Model B	4 25-MHz i486 system processors; 4G bytes of disk storage; 64M bytes of memory; UPS port; 1 floppy disk drive; ¼-in. tape drive	2 to 10 25-MHz i486 processors/Symmetrical	14.8G bytes	16M to 128M bytes	Ethernet	Redundant CPU, memory, disks	1 proprietary system bus; 1 Multibus	Unix, TCP/IP, NFS, Portable NetWare, LAN Manager for Unix	7 to 14 multibus slots; 12-system bus	$182,000 for standard configuration; starts at $75,000
	U6000/85	4 25-MHz i486 system processors; 380M bytes of disk storage; 64M bytes of memory; UPS port; 16 serial ports; Ethernet controller; ¼-in. tape drive	2 to 30 25-MHz i486 processor/Symmetrical	89.9G bytes	16M to 384M bytes	Ethernet	Redundant CPU, memory, disks	1 proprietary system bus; 1 multibus	Unix, TCP/IP, NFS, Portable NetWare, LAN Manager for Unix	11 to 44 multibus slots; 26 system bus	$290,400 for standard configuration; starts at $114,400

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VGA = Video graphics array

This chart contains a representative selection of superservers. Other vendors not included may offer comparable products.

SOURCE: MICHAEL HURWICZ, EASTSOUND, WASH.

(continued from page 41)
operate at full speed simultaneously. While personal computers can support multiple network cards, those cards cannot usually operate at full speed simultaneously.

Superservers also frequently use disk arrays, which offer speeds many times faster than even the fastest individual disk. For instance, arrays often offer 40M bit/sec transfer rates on each disk channel vs. less than 5M bit/sec for a single disk. But individual personal computer users can almost always get by with a single high-speed disk and are not willing to pay the added price of a disk array.

Finally, superservers make use of technologies such as caching or high-speed memory to eliminate potential performance bottlenecks. Personal computers typically do not require or would not benefit from these technologies.

Why switch?

These superserver capabilities are admittedly impressive. But why should users abandon the traditional personal computer-based file server when today's 33-MHz Intel 80486-based microcomputer can execute instructions as quickly as an IBM mainframe?

The personal computer-based file server has many advantages. For example, maintenance and repair services are widely available, not only through the manufacturer but from any number of third parties. In-house personal computer expertise is also easy to come by.

The versatility of the personal computer makes it a safe investment, too: An 80386-based microcomputer can run Novell, Inc.'s NetWare 2.X or 3.X, Banyan Systems, Inc.'s VINES, Microsoft Corp.'s LAN Manager and practically every other network operating system on the market. And when you want to upgrade the server to the next generation of personal computer, the current server can start a new life as a workstation running DOS, Windows or OS/2.

Despite its advantages, the personal computer-as-file server is often a square peg in a round hole. Personal computers were designed for single-user, single-tasking applications, which is reflected in their single-processor, single-bus design. Nor are personal computers optimized for network or disk I/O; networking and massive disk storage weren't a consideration when the blueprints for the first personal computer were drafted.

As a result of these limitations, the personal computer-based file server sometimes just doesn't make the grade. It isn't fast enough to perform all the functions companies may require, such as supporting large numbers of users and networks, heavy network traffic or server-based applications that make significant demands on the server's processor and disk.

> The personal computer-as-file server is often a square peg in a round hole.
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By contrast, the superserver is designed to provide network services such as file, database and communications. That may mean multiple processors, and sometimes multiple buses, are needed to service multiple users and tasks more efficiently than a personal computer-based file server. It certainly means the capacity to store and quickly access data and tens of megabytes of memory will be needed.

> Superservers are more expensive to buy and maintain than personal computers.
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In addition, superservers often have features that enhance their reliability, serviceability and manageability. For example, disk arrays usually provide fault tolerance in addition to radically improving disk performance. In some configurations, any single disk in the array can fail without affecting server operations. Many superservers also offer management, maintenance and diagnostic features that make it easier to change configurations and determine problems remotely.

Not perfect

Superservers do have some drawbacks, however. They're more expensive to buy and maintain than personal computers. Many superserver vendors are small and could still get knocked out of the market, leaving their users to fend for themselves.

In addition, superservers are less versatile than personal computers, making them a riskier investment. The superserver would make a pricey workstation, if indeed it could be used for that role at all. Some superservers lack features such as a screen and keyboard that workstations require.

Furthermore, superservers' special features, such as multiprocessing, may limit the type of server software they're suited to run. And finally, since superserver technology is so new, network operating system software that takes full advantage of its power is still evolving.

Due to these problems, many of today's superserver purchases are for experimental or pilot projects, industry observers say. However, many of the superserver's problems will be solved or mitigated with time, promising a much larger role for this technology in the future.

Vendors, at least, certainly seem to think so. Last year, *Network World*'s feature article on superservers ("Superservice with a smile," *NW,* Feb. 12, 1990) mentioned six machines, four of them from start-ups. This year, no fewer than 14 vendors are vying for a piece of the pie, including giants such as AT&T and Digital Equipment Corp., which were nowhere to be seen last year (see chart, page 44). Established supercomputer vendors such as Alliant Computer Systems Corp., Convex Corp., Corollary, Inc. and Sequoia Systems, Inc. are also taking aim at the superserver market (see "From supercomputer to superserver," page 54).

These vendors use a variety of technical improvements to produce servers in the "super" class. Probably the most important of these is the architecture of the system bus, which has to handle all data transfer within the machine, including network and disk I/O.

"The limiting factor in PC-based [servers] is the bus," says Peter Kastner, a vice-president with the Aberdeen Group, a Boston-based market research and consulting firm. "That's why some vendors have thrown away the PC bus for internal data transfer and used much faster or multiple buses in order to provide enough data to feed these voracious [microprocessor] chips."

> "The limiting factor in PC-based [servers] is the bus," Kastner says.
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Multiprocessing is another common mark of the superserver. Machines that offer asymmetric multiprocessing — such as the offerings from NetFRAME Systems, Inc. and Auspex Systems, Inc. — dedicate processors to particular tasks, such as network I/O or application processing.

By contrast, superservers that provide symmetric multiprocessing, such as Compaq Computer Corp.'s SystemPro, Advanced Logic Research, Inc.'s Powerpro Array and AT&T Computer Systems' StarServer E, assign processors to tasks on an as-needed basis.

Symmetric multiprocessing is less likely than asymmetric to waste processing power. However, superservers that use symmetric multiprocessing are more difficult to design; it's also more difficult to adapt existing software, such as network operating systems, to symmetric machines. Thus, many current superserver vendors have opted for asymmetric multiprocessing.

Featuring reliability

Many superserver vendors also offer special reliability features. These may include redundant components and error correction code (ECC) memory that can correct transient memory glitches on the fly.

For example, the NetFRAME products offer redundant power modules, while Parallan Computer, Inc.'s Server 290, Series II, Model 15 offers redundant system processors, Micro Channel Architecture buses and adapters, Small Computer System Interface channels, buses and controllers, power supplies, memory banks and controllers. A number of vendors, including NetFRAME and Parallan, offer ECC memory.

Beyond these basic design factors, superserver vendors support disk space and random-access memory in quantities that don't make sense in the personal computer world. Many can support 16G bytes or more of disk space and 64M bytes or more of RAM.

The added performance and capacity of the superserver naturally come at a price. Where $10,000 or $20,000 gets you a fairly high-end personal computer-based server, that amount will only get you in the low end of the superserver market.

The NetFRAME NF100ES, at $12,950, is the least expensive superserver listed in the chart. More typically, superservers cost in the tens or hundreds of thousands of dollars, and it's possible to configure superservers that cost more than a million dollars, such as NCR Corp.'s NCR System 3600.

However, initial price may not be the biggest obstacle to a superserver purchase. In fact, a superserver may be more cost-effective than the multiple personal computer-based servers it would take to do the same job.

> The added performance and capacity of the superserver naturally come at a price.
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For example, say you have 100 users working with a desktop publishing application. It might take four personal computer-based servers, each costing $10,000 (including four copies of the network operating system) to support these users. On the other hand, a single superserver costing $30,000 (with only one copy of the network operating system) might be able to support these users.

Software lacking

A bigger obstacle preventing many users from flocking to superservers is the lack of software optimized to take advantage of the superserver hardware, industry observers say.

"There's confusion as to whether the operating system should be Unix, OS/2 or [NetWare]," says George Weiss, vice-president in the mid-range computing strategies group for Gartner Group, Inc., a Stamford, Conn.-based consulting and market research company.

"Unix does not offer good synergy between the server and the PC DOS desktop," Weiss adds. "No one's sure how OS/2 is evolving, whether Microsoft OS/2 will split away from IBM OS/2. [NetWare] is holding pretty strong, but it's not at a high-performance level on superserver types of processors because there's no built-in support for multiprocessing."

However, the demand for multiprocessing NetWare may grow in step with server-based applications.

"NetWare doesn't need multi-

(continued on page 54)

Evaluating LAN security

By THOMAS PATTERSON

While the basic tenets of good security are not changing, implementing security for local-area networks requires substantial rethinking on the part of the network manager.

LANs are presenting many network managers with problems they've never faced in the mainframe world, forcing them to conceive a specific LAN security policy and select products to implement that policy.

LANs have made work easier for most office personnel, but they've also made work much more difficult for those in charge of information security. In all of today's LAN architectures, infor-

(continued on page 50)

Patterson heads the technical staff of the Information Security Division at Centel Federal Systems, Inc. of Reston, Va., a systems integration service provider. As technical director, he is responsible for the development of the Assure family of information security products.

How access control, encryption and audit trails play a role in setting LAN security policy.

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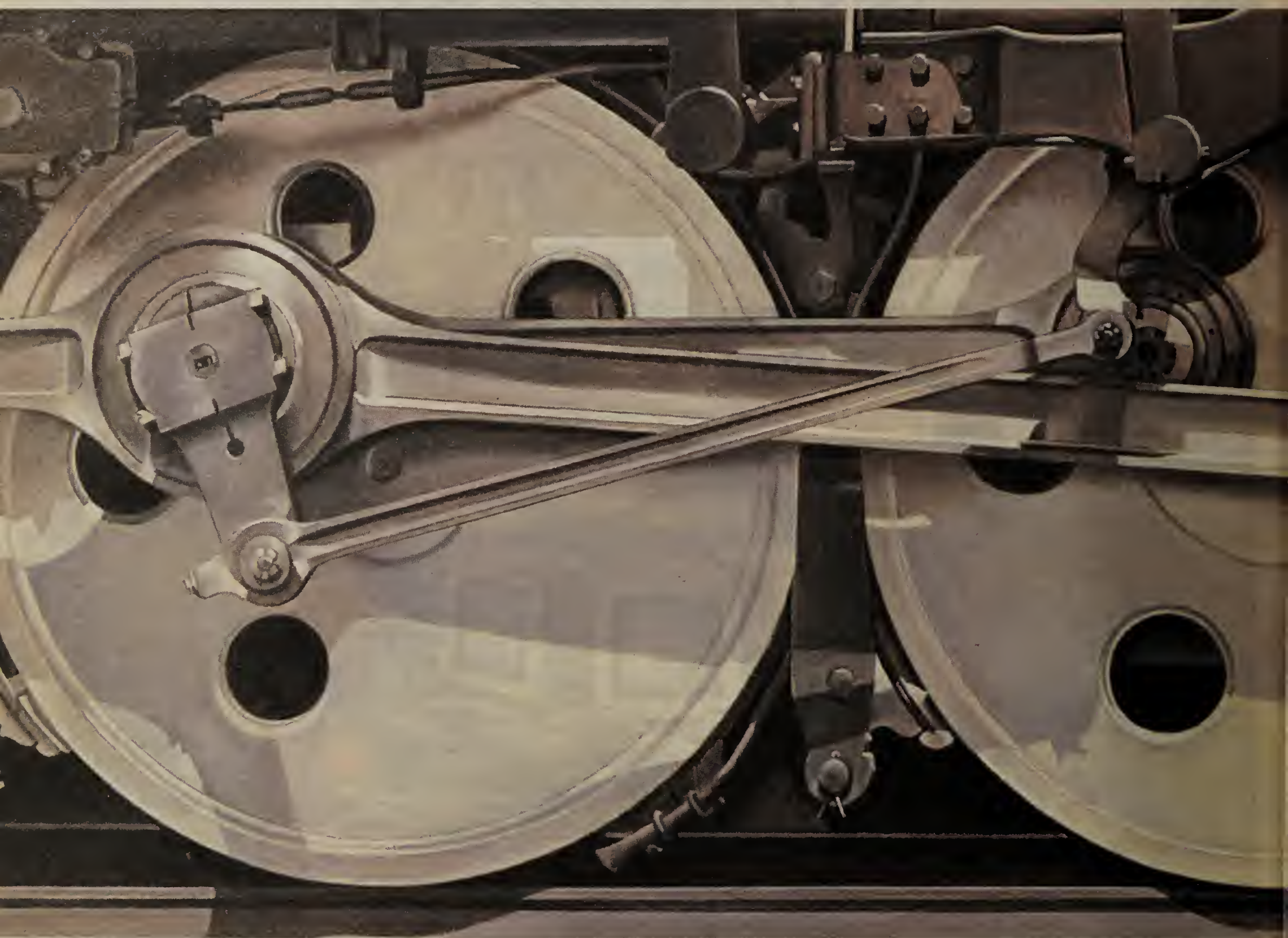
Systems integration.



The machinery is complicat

Keeping a business on track is tough enough without having to engineer your systems yourself, especially these days.

Today's solutions are more complex, and more is expected of them. Beyond helpful, they're now "mission critical." And your choices—for vendors, operating systems, protocols and applications—have grown beyond counting.

It's enough to make rational people scream for help, which is exactly what they're doing, calling systems integrators to build new solutions and upgrade existing ones. But how do you choose a systems integrator?

We'd say the first things to look for are experi-

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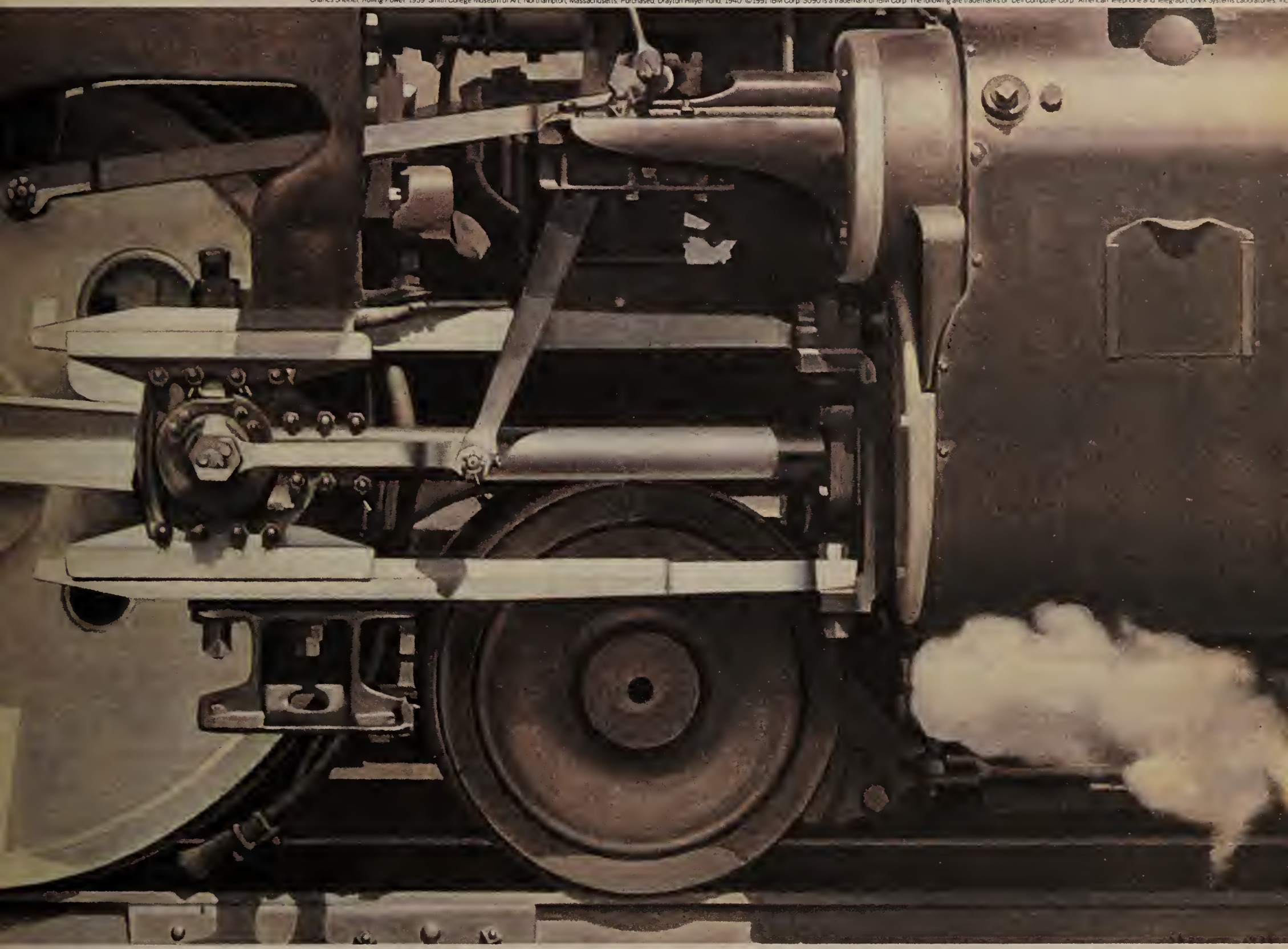

ed, but the passenger shouldn't have to worry about it.

ence and depth. Find someone who's solved your kind of problem before, for your kind of business. Someone whose knowledge of systems and software, networks and network management, from PCs to mainframes, is total.

Someone like IBM.

You'll also need someone who can manage big projects, hire the right subcontractors, train your people and steer you toward future technologies.

Again, someone like us.

Of course, you'll want a company who can be objective about the products they recommend, and it may surprise you, but around 40% of a typical IBM project goes to non-IBM sources.

In fact, we recently automated 625 stores for Zales Jewelers, integrating Dell® PCs running AT&T® UNIX® applications, all connected to an IBM 3090™ host.

We've also integrated 660 locations for the Pennsylvania Liquor Control Board, from cash registers to network management and training, and we finished the job ahead of schedule and under budget.

Which, we hope, shouldn't surprise you. We've been a leading systems integrator for over three decades and, as we've said, experience pays off. For us, for you.

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(continued from page 47)
mation becomes vulnerable once it leaves the server.

Thus, today's network must extend the security features provided by the server, such as file protection and logon control, to the workstations. Security must also be extended to all the other communications devices attached to the network, such as remote personal computers and servers, as well as to laptops and other portable systems accessing the network remotely via telecommunications.

Network managers should employ security mechanisms to control user activities for each type of device that can access the network.

Setting the scene

Let's take a simple scenario. Your company has just moved into a new building. The entire building has been prewired for data communications. Therefore, you can network all the computers throughout the building with little effort, avoiding the need to run cable through the walls and ceilings or physically carry a disk from the third floor to the sixth floor just to print a letter.

Now the down side. Your organization sublets or shares space on the second floor with another company, and the same wiring is used by both tenants.

Suddenly, the attractive feature of a prewired building becomes a new source of vulnerability.

Because many LANs broadcast messages to all users on the network simultaneously, messages containing sensitive or proprietary information reach every data outlet in every room in the entire building, including, unfortunately, that company with which you share space.

Although the data packet containing the message is recognized only by the users who are supposed to receive it, anyone can intercept the message, using equipment such as a protocol analyzer.

> Today's net must extend the security provided by the server to the workstations.
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Let's look at another scenario. Your company's information systems run on a self-contained LAN on one floor of a building. Although accounting applications run on one server on that LAN, the databases on another and the engineering department's applications on a third, users can access one another's data if they are determined enough.

In most organizations, there is at least one person — if not an entire group of people — who enjoys meddling with the network. It's not uncommon for these people to try to get into files they don't have the authority to access — not maliciously, but just for fun.

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They think, "Wouldn't it be fun to print an extra copy of the sales director's expense report?" or "Wouldn't it be funny to change the corporate database to print out the names of the leading rushers in the National Football League when queried for the sales department's 10 best sales prospects?"

Evaluating risk

The human factor is the most difficult to quantify of all security concerns. While there will always be hackers, a far more common threat is disgruntled employees, meddlers who are curious about the network setup and users who just make mistakes.

With this in mind, reconsider the two scenarios outlined above — the threat of LAN penetration from outside and inside the organization. Both scenarios are possible in most LAN computing environments today.

Here are some checkpoints to determine whether your LAN is a security risk.

- If you haven't taken security measures and are using a popular, commercially available LAN, such as Novell, Inc.'s NetWare, you are at risk. Anyone, either an insider or outsider, can easily obtain from practically any computer bookstore detailed documentation that tells how to access your network.
- If you haven't taken security measures and the cable for your accounting or personnel group also connects with other groups, such as engineering, you are at risk. Users in these groups may be able to access files and information that they are not authorized to access.
- If any network-attached microcomputer is running software that has not been approved by the company, you are at risk. Some users may have pirated software, which can mean severe legal penalties, and shareware or software that's on floppies with no known origin can introduce viruses into the network.
- If any users on the LAN have modems attached to their microcomputers, you are at risk. Such users can download viruses from bulletin boards.

Most organizations are vulnerable to the threats listed above. Fortunately, doing something about them does not require expensive, complicated equipment.

The vulnerability threat

When microcomputers and LANs first appeared on the business scene, the emphasis was on openness and ease of use, not on restriction and control. No one took microcomputer security seriously.

Once the LAN became a valuable asset, its security weaknesses became more obvious. This realization led to the introduction of LAN-based security products by vendors of established minicomputer and mainframe offerings. But these products cannot be effectively administered and managed if an overall security plan is not in place.

Creating a LAN security policy shouldn't be difficult. In fact, if your company has mainframes or minicomputers, you probably already have a security policy.

While the computers are certainly different, many of the basic security policies used to protect minicomputers and mainframes can be applied to protecting LANs. These include user and system activity audits, logon restrictions and discretionary access control, which is regulating access to a machine through use of user identifications.

> Once the LAN became a valuable asset, its security weaknesses became obvious.
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Of course, there are significant differences. Minicomputer and mainframe systems come with security built in as part of the package, but LAN operating systems typically have no workstation-level security.

In some ways, keeping LANs secure is more difficult than securing individual processors. If you don't have an existing policy, you should certainly establish one.

The basics begin with a survey of your environment. In this survey, your goal is to determine what you have. Some items to include on the survey list are: computers, networks, operating systems, applications, users, security officers, computer managers, training and support.

> A truly effective security solution should encrypt sensitive files on the workstations and net server.
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After you've surveyed your environment, you need to decide which security products work with what you have, which vendors provide technical support and training, and how these products will change your current environment.

If you decide to add security to your LAN, you will find many products available to help. The following is a summary of the various features and services available.

Encryption

A truly effective security solution for today's environment should protect the network by encrypting sensitive files on the workstations and net server.

To ensure that the encrypted files can be transported for use on other systems, such as mainframes or wide-area networks, it is important for the encryption to meet such accepted standards as the government's Data Encryption Standard (DES). DES, an encryption routine set forth by the

(continued on page 52)

Sample hazards and their remedies

Threats	Countermeasures					
	Encryption	Disaster recovery	Audit trail	Access control	Object reuse	Virus protection
Natural disasters		✓				
Hackers	✓		✓	✓	✓	✓
Hostile employees	✓		✓	✓		✓
User mistakes			✓	✓		✓
Viruses		✓			✓	✓
Industrial esplonage	✓					

GRAPHIC BY SUSAN SLATER

SOURCE: CENTEL FEDERAL SYSTEMS, INC., RESTON, VA.

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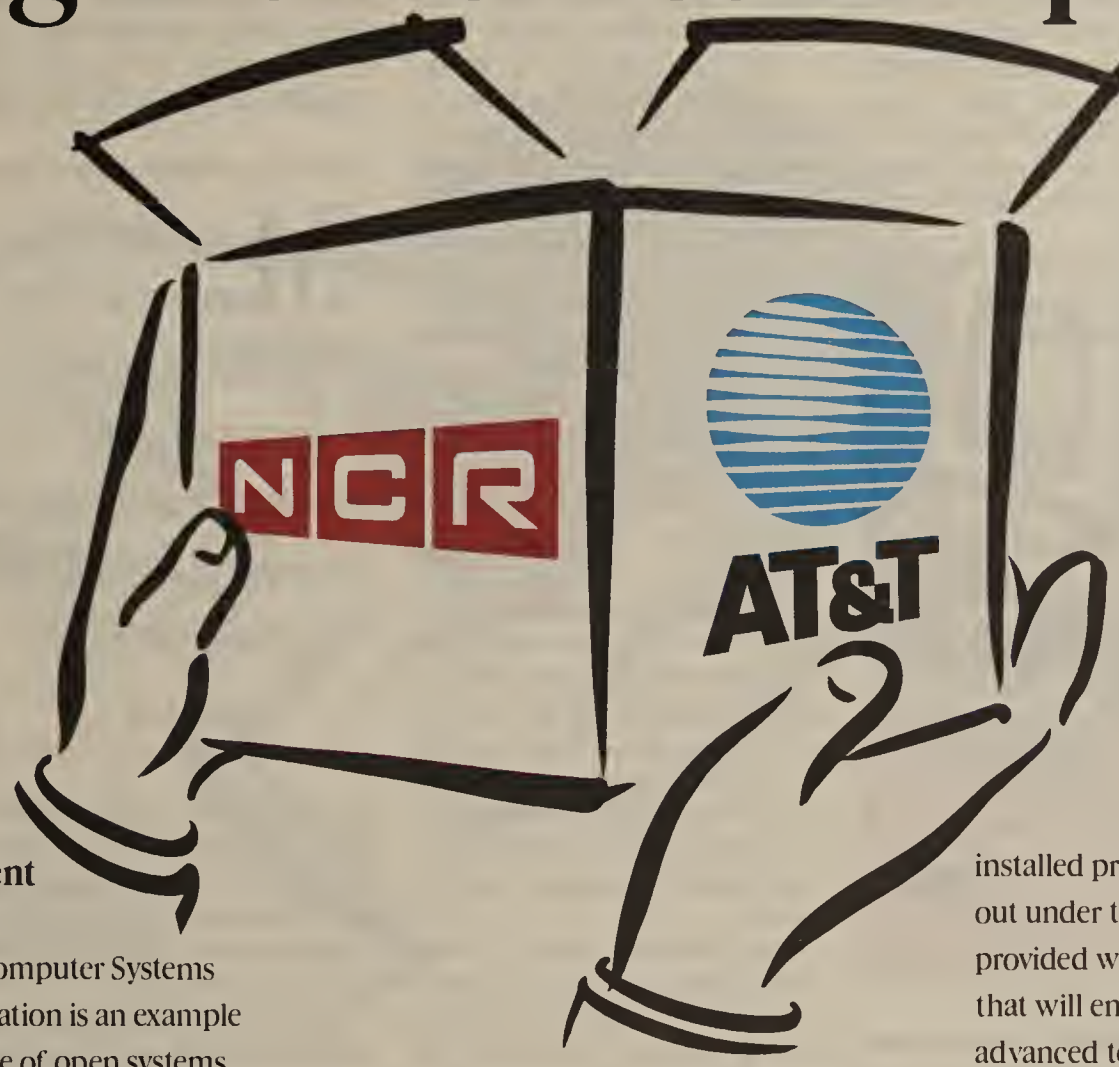

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The merger of AT&T Computer Systems Division with NCR Corporation is an example of the tremendous promise of open systems.

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—Chris Christiansen, The Meta Group

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Open, Cooperative Computing. The Strategy For Managing Change.

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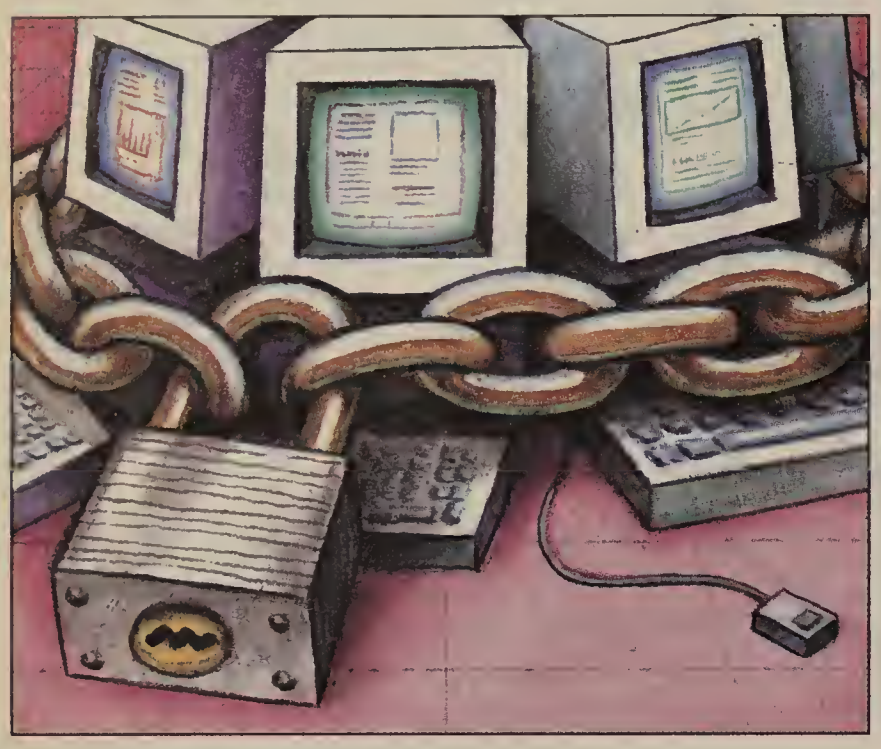
(continued from page 50)
National Institute of Standards and Technology, reorganizes data into a nonreadable form in conjunction with a key word or phrase that is assigned during the encryption process.

Remembering keys that were used during the encryption and training users how to perform the encryption can make the process a difficult chore for users. In addition, an encrypted file is only as secure as the encryption key used. In fact, while the DES algorithm is widely known, DES is designed to allow a large number of keys to be used.



An encrypted file is only as secure as the encryption key used.

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If the security system does the encryption automatically, it takes the burden of memorizing the keys off the users. So it's important for the encryption to be managed automatically and to be completely transparent to the user.

When this encryption is extended to the files stored on network servers, the data is protected even when it is transmitted over the network.

Audit trail

Depending on the security threats you face and the regulations your company has adopted, you may need to keep a record of all user and system actions — a protected audit trail — in order to hold users accountable for their actions.

An audit trail also helps security personnel detect unauthorized attempts at system and network access.

For convenience, this audit trail should be automatically copied and uploaded to a designated network file server, where the network administrator or security officer can retrieve it for review.

Because most network operating systems audit actions on the servers alone, such systems miss actions that occur on the workstations. Because copying floppy disks from a: (the local floppy drive) to c: (the local hard drive) and then to f: (the server drive) can introduce a virus into the network, you should look for an audit system that has both a workstation and server component. One without the other will not be sufficient.

Access control and viruses

Once authorized users have identified themselves to the network through use of a logon and password, security mechanisms must be in place to prevent unauthorized access to directories and files on the network servers and local disks.

Users must be restricted to running only authorized programs, and those programs should be restricted to reading and altering only authorized files.

Users often walk away from their workstations, leaving potentially sensitive information on the screen and their system and the network wide open to any casual passerby. An effective security system will blank the screen and lock the keyboard when inactivity indicates that the user has left the system unattended.

Users often walk away from their workstations, leaving information on the screen and their system open to any passerby.

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The user will have to be reidentified in order to gain access to the system. In the meantime, no unauthorized user will be able to read what is on the screen, use the workstation or gain access to the network.

Also, files must be randomly overwritten with 1s and 0s before being deleted, and switching users must entail the clearing of all resident memory areas, including high memory. Effective security products should be able to automatically perform these functions.

Remember that securing data from user accidents is also important. For example, in the root directory, if you forget the a: prefix when using a wild card option (*.*) to delete data on a floppy, you will accidentally delete the root system files and thus make your personal computer unbootable.

Any effective security policy must address the threat of viruses. Various software products provide partial protection. For example, software that scans files for a virus' signature pattern — a unique string of code particular to a virus, such as the Friday the 13th, Stoned or Jerusalem viruses — provides one way to deal with the problem (see "Good virus protection comes cheap, test shows," page 1).

Every variant of a virus has a different signature. To ensure protection from both known and unknown viruses, security products must prevent viruses that are brought into contact with the system from propagating and doing damage.

Security products that protect executables from being modified, prevent users from accessing the disk's file allocation table or prevent modification of the vector table can keep viruses from doing just that.

All these features must be administered consistently across the entire network for security to be effective. Entry of user authorizations, file access permissions, and options for protection, encryption and audit should be as easy, unambiguous and error-free as possible for security personnel to implement, support and manage.

An important feature to look for in security system software is a security management interface that walks authorized users through the process of setting up their security configuration, using a series of menus and prompts. A system for distributing the security configuration to all workstations from a central point is needed to keep the security controls in all workstations consistent and to lighten the load for security managers.

Make sure any product you add to your network — whether hardware or software — actually helps, not hurts.

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Once a security policy has been developed, users must implement it with products. Historically, LAN security products have been software-based.

Unfortunately, a security system based solely on software cannot adequately protect sensitive data because many of these features, such as booting off a floppy, cannot be implemented in software alone.

Make sure any product you add to your network — whether hardware or software — actually helps, not hurts. For example, some products can cause degradation of the network, loss of operability of some applications and decreased functionality, thereby resulting in user frustration.

Finally, keep in mind that any security products must evolve along with the operating systems used on the network. If you are planning to use a new version of DOS on your network, you'd better be able to get a new version of your chosen security system. Your current security products may not be compatible with the new version of the operating system.

With all these factors to consider, developing a LAN security policy may seem like an insurmountable challenge. But you can provide LAN security through a combination of administrative procedures and technical features carefully organized into a system that tightly controls access to resources by both internal and external users.

Done correctly, information security can pay for itself by decreasing downtime, reducing damage to important files and limiting legal liability for sensitive information.

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processing to support file and print I/O," says Jamie Lewis, vice-president and principal analyst with Salt Lake City-based Clarke-Burton Corp., a research and consulting firm specializing in network computing.

According to Lewis, the multiprocessing advantage will come in supporting additional functionality, perhaps by allowing server-based NetWare Loadable Modules (NLM) such as NetWare for Systems Application Architecture or Oracle Corp.'s Oracle Server for NetWare to run on their own processors. "Until operating systems really take advantage of multiprocessing, it's going to be a slow starter," he concludes.

The state of superserver software offerings is reflected in the type of software often run on superserver-class machines. The majority of machines sold as superservers last year went out as multiuser hosts rather than as true servers, according to Susan Frankel, an analyst with Framingham, Mass.-based International Data Corp., a market research and consulting firm. More than 60% of the superservers sold act as hosts for attached terminals or personal computers in terminal emulation mode, she says, but that is starting to change.

Typical superserver software does vary considerably from vendor to vendor. For example, the majority of both NetFRAME superservers and Compaq SystemPros are sold as NetWare servers, according to sources at both companies.

Another obstacle hindering superserver growth is the fact that superservers are often nonstandard: No two superserver vendors use the same architecture. This tends to raise the cost of service and maintenance.

For instance, since superservers are a relatively new technology, it's very possible your in-house systems personnel won't know how to repair them. Therefore, you may have to rely on the superserver vendor for technical support. This can be a slower and more costly process — both in terms of service contract costs and lost worker productivity — than using in-house technicians.

But in-house superserver expertise can be cultivated, without great risk to the firm, through pilot projects. In addition, superservers offer special reliability features that allow them to function despite problems that would disable a personal computer.

For example, when one of their components fails, some superservers can send an alert to the network administrator — often while remaining operational. The alert may be sent via electronic mail and displayed on a monitor, or the superserver's maintenance system may be able to call telephone numbers and use speech synthesis to verbally report the problem. A substitute for the failed component can be sent in by overnight courier, and the incident can be resolved with minimal downtime.

Most superservers, however, do not yet offer extensive remote management capabilities. Three that do are NetFRAME, with its Server Activated Maintenance; AT&T Computer Systems, with its Remote Management Package; and Parallan, with its Maximum Availability and Support Subsystem. NetFRAME's Server Activated Maintenance module is battery powered, so that it doesn't fail even if the power does.

Many vendors also provide remote diagnostics to make it easier for a few experts to care for far-flung superservers: The network administrator can simply dial into the superserver from another site and run diagnostics.

Vendor selection

Superserver users are likely to be dependent on the vendor, not only for technical support, but for spare parts and upgrades as well. Given the substantial investment in superserver hardware, training and support, it's important to protect that investment by choosing a vendor that will remain healthy in the long run.

However, some of the most innovative and competitively priced superservers come from small companies barely out of the start-up stage.

"It's still a question of who will play the leading role and who will be around for the long run," Clarke-Burton's Lewis says.

New, small companies may become older, larger companies. Until that happens, however, the current uncertainty works to the advantage of vendors such as Compaq and IBM. Compaq's SystemPro, with its Extended Industry Standard Architecture bus and a maximum of two processors, is closer to a personal computer architecturally than any other superserver on the market. And while IBM's Personal System/2 Model 95 is a standard personal computer architecturally, its considerable RAM and disk storage capacities allow it to compete with superservers.

Small superserver vendors may not like to admit that they're competing with these machines, which technologically are in a different class from products that can support eight processors and have multiple independent buses. The truth is that the SystemPro and the Model 95 often beat smaller superserver vendors when check-writing time rolls around. One reason for this is that many users would rather deal with a Compaq or IBM than with a smaller company with which they are unfamiliar.

For instance, Baxter Healthcare Corp., an $8 billion-per-year health care services provider based in Deerfield, Ill., selected the SystemPro largely because Baxter already had a "strong working relationship" with Compaq, notes Doug Jensen, a consultant in Baxter's Office Technology group. Because of this existing relationship, Jensen says, Baxter was able to benchmark the system extensively before purchasing it.

Who needs them?

Users that will be most attracted to superservers are those downsizing operations and putting intensive data processing applications on a LAN, notes Lewis. But he adds, users move slowly in this area, making it an evolutionary rather than a revolutionary change.

In many cases, says the Gartner Group's Weiss, the superserver can function as an enterprise-level server between the work group and the mainframe. For instance, the superserver can act as a message router, a specialized application server, a high-performance computational engine, a database management platform for client/server computing, or a working repository for corporate data. That would insulate the mainframe from what Weiss calls the "biggest nightmare of the mainframe data processing service" — namely, large numbers of users making ad hoc inquiries or entries.

Users will tread cautiously in implementing such applications, however, says Weiss, because it takes time to form a strategic plan and understand fully just what the superserver offers for their particular company.

Thus, despite the performance, capacity and reliability advantages superservers offer, both user strategies and networking software may have to go through some growing pains before the superserver becomes superpopular.

> Most superservers do not yet offer extensive remote management capabilities.
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> Users most attracted to superservers are those who are downsizing operations.
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From supercomputer to superserver

The multiprocessing technology, fast buses and massive I/O capabilities that have been showing up in superservers during recent years are nothing new.

Supercomputer vendors have been offering similar features for years.

However, because of their cost, supercomputers have been limited mostly to scientific or technical applications; they were far beyond the reach of most commercial users.

But just as microcomputer vendors such as Compaq Computer Corp. have been pushing their technology up into the superserver realm, supercomputer vendors — including Alliant Computer Systems Corp., Convex Corp., Corollary, Inc., Pyramid Technology Corp., Sequent Computer Systems, Inc. and Sequoia Systems, Inc. — have been pushing their technology down into the microcomputer world.

The result of those shifts is that the differences between superservers and supercomputers are often those of scale, software or history rather than of basic technology.

For instance, a Compaq SystemPro can grow only to a certain level, perhaps 100 or 200 users, says Peter Kastner, a vice-president with the Aberdeen Group, Inc., a Boston-based market research and consulting firm.

A low-end Symmetry 2000 computer from Sequent may support that same number, but a higher end Sequent may be able to handle 1,000 users, he adds.

It's not just that supercomputer hardware can support the levels of network and disk I/O generated by large numbers of users, Kastner says.

The supercomputer vendors have also had more time to address software and administrative problems associated with operations of that size.

In addition, supercomputer vendors have developed software for their machines that is different from the software offered by superserver vendors.

"For instance, NetFRAME [Systems, Inc.] is really focused on large LAN operations," Kastner says. "Sequent is focussed not only on the LAN, but very intensely on the wide-area network."

Sequent might be a good choice for a user that wants multiple communications gateways configured in several different ways, Kastner says.

Application software also distinguishes between supercomputer vendors. Sequent, Sequoia and Stratus Computer, Inc. have invested heavily, for example, in applications for Wall Street, such as stock ticker broadcast applications. Having invested in that market, they can better support that industry's needs, Kastner says.

On the other hand, while vendors such as NetFRAME were aiming at the commercial local-area network market from the onset, supercomputer vendors are coming out of the scientific and technical world, and they may still be evolving the software and know-how to take on commercial environments.

"We've mostly been successful in the TCP/IP arena," acknowledges Bill Trainer of Sequent's corporate communications group. "But in the next 12 months, we'll be rolling out products that address the larger market share PC LANs."

"[The supercomputer vendors'] bread and butter is technical," says George Weiss, vice-president in the mid-range computing strategies group for Gartner Group, Inc., a consulting and market research firm in Stamford, Conn. "They know that world very well."

However, the technical market is more limited and growing more slowly than the commercial market, he says.

The increasingly graphic, data-intensive nature of commercial applications means that they have evolved to a point where they can use supercomputer-level power.

Meanwhile, microcomputer technology has advanced to the point where it can be used to build less expensive supercomputers.

Thus, it is natural that supercomputer vendors are beginning to eye the commercial market.

— *Michael Hurwicz*

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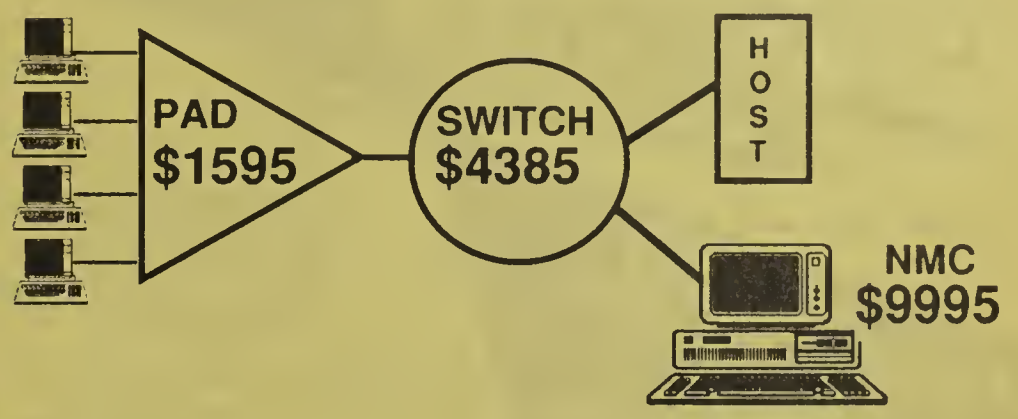

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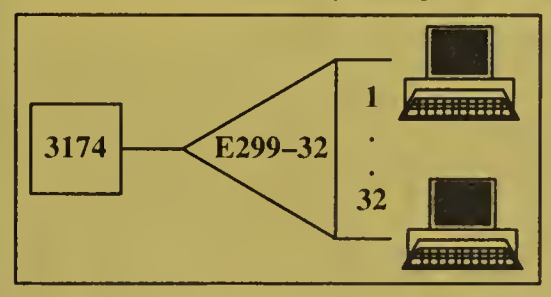

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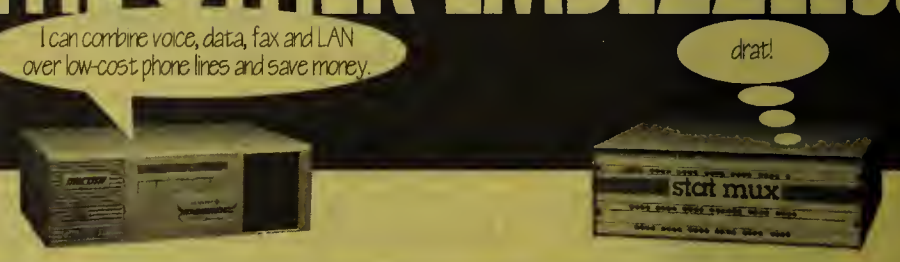

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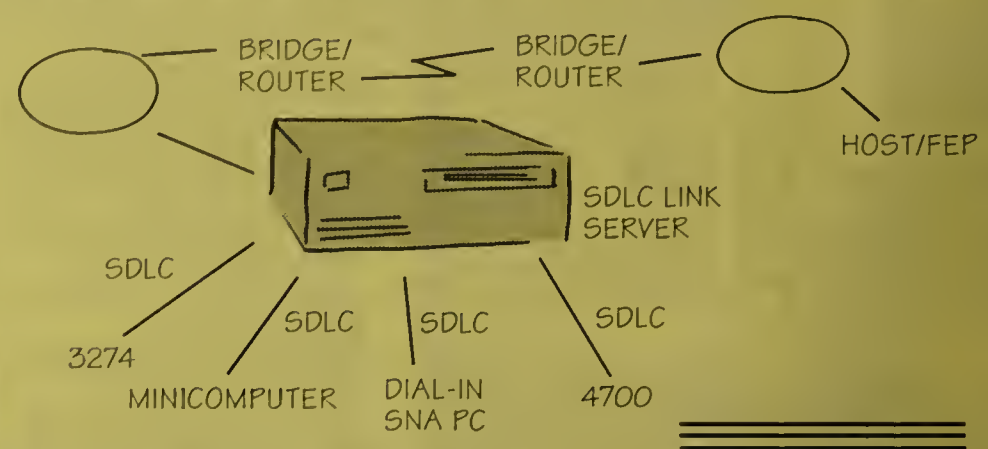

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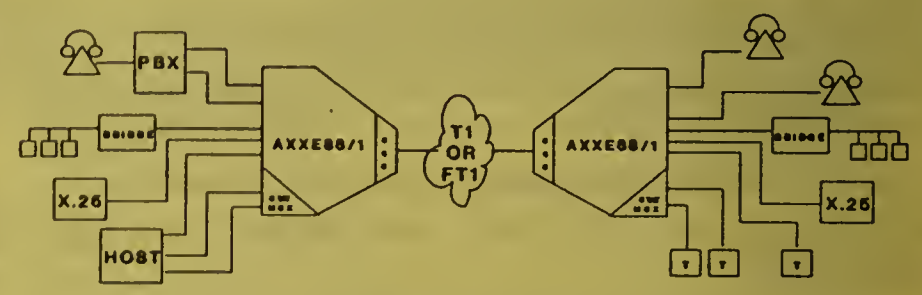

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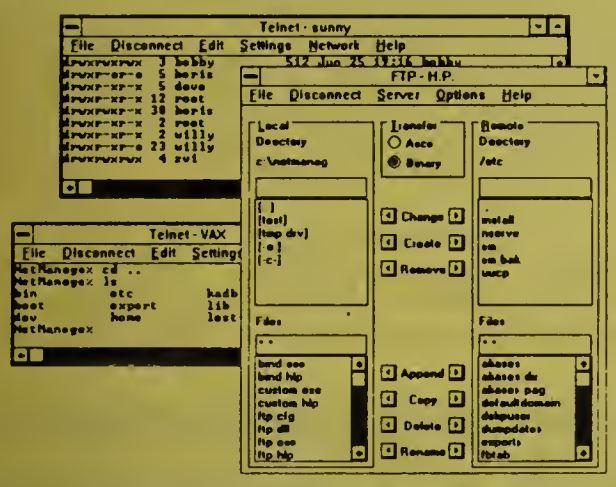

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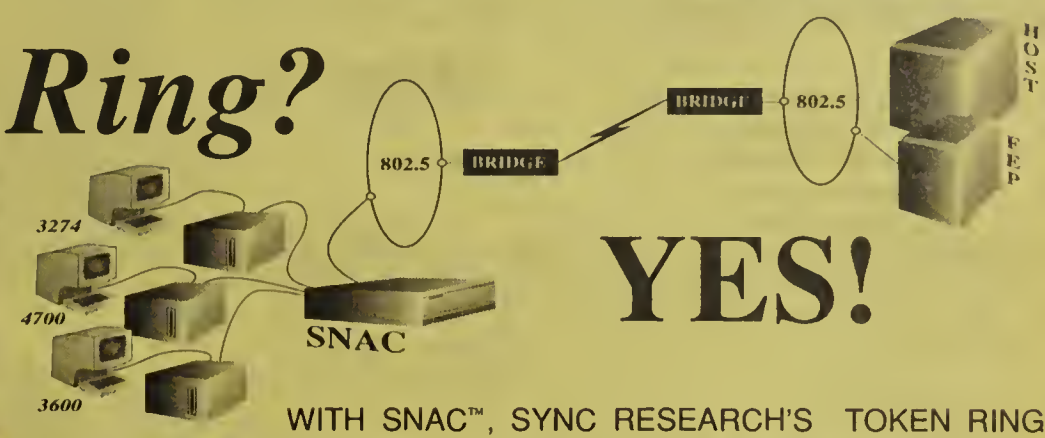

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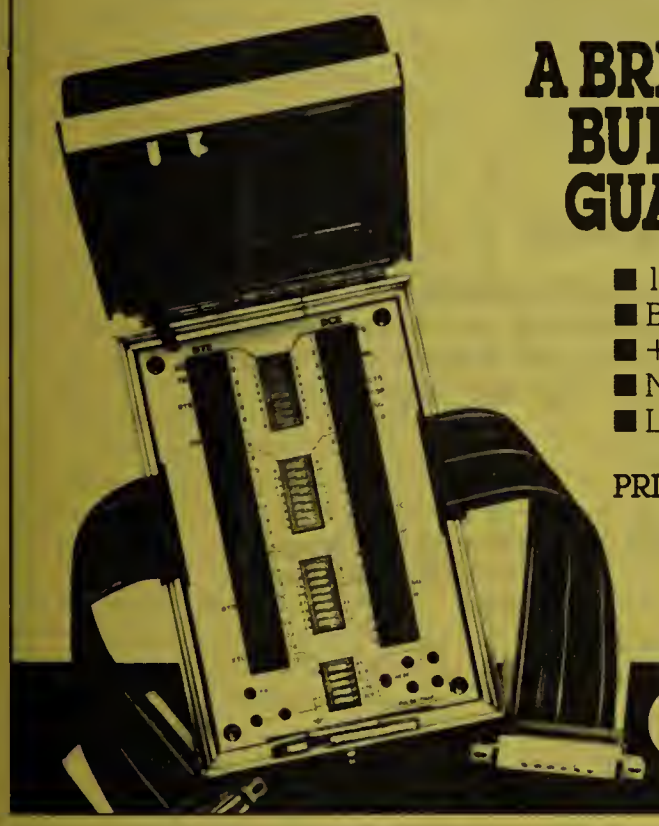

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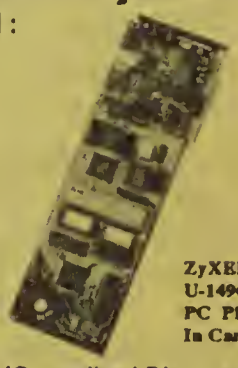

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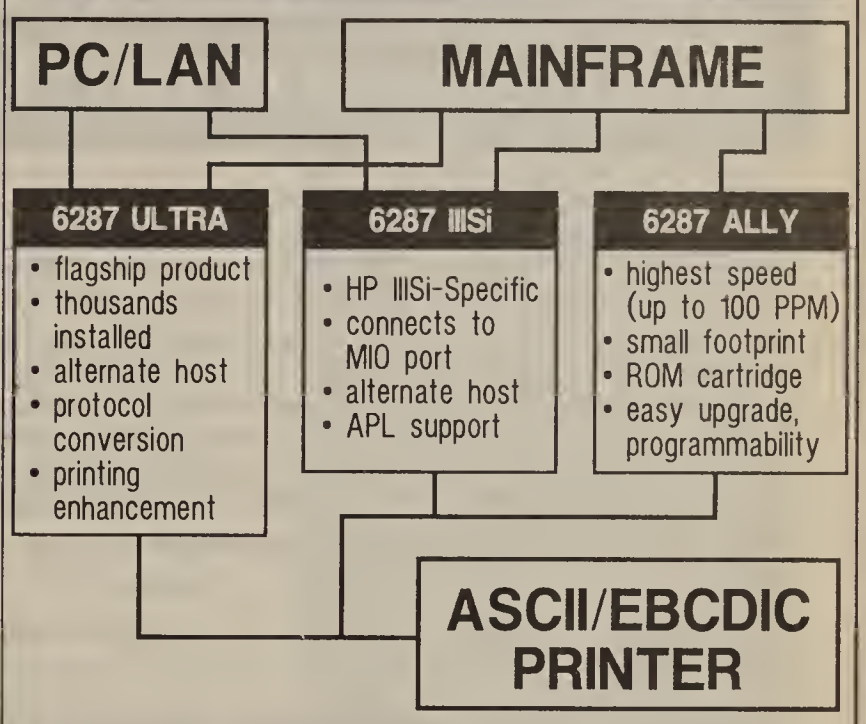

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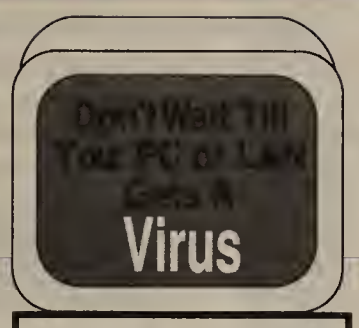

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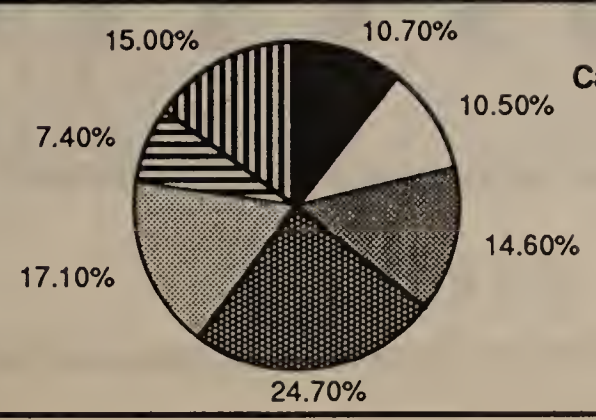

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AT&T working on Global SDN

continued from page 29

on-net feature takes its name from the fact that all calls to international locations can be forced to traverse a company's Global SDN, even if the standard international calling code is used.

AT&T began supporting the forced on-net feature for calls originating from the U.S. in May, but it is not widely available for calls originating outside the U.S.

In Phase 3, AT&T plans to link its Common Control Signaling System 7 (CCS7) network and customer databases with foreign carriers' CCS7 nets and customer databases.

This will enable Global SDN subscribers to obtain a consistent feature set around the world by enabling carriers to exchange information about the types of features to which customers subscribe.

Also, it will enable AT&T to roll out several enhanced features for Global SDN, such as automatic number identification (ANI), network ring-again, switched 64K bit/sec service and eventually the translation of spoken words from one language to another in real time, Butkus said.

AT&T is trying to persuade foreign carriers to develop a common underlying architecture because such a platform is needed to migrate Global SDN into Phase 3. Butkus would not say how long it will take AT&T to develop the common architecture.

Butkus added, however, that much of the initial work on a common Global SDN architecture has already been accomplished by AT&T in conjunction with British Telecommunications PLC and Kokusai Denshin Denwa Company, Ltd., which is Japan's dominant international carrier. He said AT&T plans to deploy Phase 3 of Global SDN well before the year 2000.

In pursuing a common Global SDN architecture, AT&T is charting a strategy similar to that of US Sprint Communications Co., which is using a multilateral architecture for its Global Virtual Private Network service. This architecture enables US Sprint and its foreign carrier partners to support common feature sets and enhanced services such as network ring-again, ANI and switched 64K bit/sec service.

Public net expansion

Along with improving Global SDN, AT&T may also begin to offer public switched services in foreign countries.

Although Butkus declined to reveal any details about the expansions AT&T is mulling, he pointed out that British carriers, including Cable & Wireless PLC, are offering switched services in the U.S. He declined to comment, however, on speculation that AT&T wants to counter the British carriers by offering switched services in the U.K.

At a press conference preceding Telecom 91, AT&T Chairman Robert Allen gave a few more details about AT&T's international expansion plans. He said AT&T hopes to receive about 50% of its revenue from global equipment sales and services by the year 2000, up from 15% last year.

Allen said AT&T is not planning to build a pan-European network, although the carrier could do so quickly if customer demand develops. He added that most of AT&T's international revenue come from international switched services, which are increasing about 15% per year.

But AT&T's fastest growing international business is the sale of central office switches and equipment to foreign carriers. On this front, AT&T's sales rose from $1 billion to $1.5 billion last year.

NTI airs ISDN interface

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Malone noted that using ISDN to access a frame relay service would be one step toward offering switched virtual circuits within frame relay networks, a capability that is not currently available.

Customers must currently access frame relay services via dedicated access links, whereas with ISDN, they could use switched access and, theoretically, pay less.

According to Malone, this could also be a boon for BRI. "There are no applications driving BRI right now," he said. "This could be one."

Two demonstrations

At INTEROP, Northern Telecom demonstrated two applications that used BRI access to its LPP. Both the ISDN service and the LPP were supported by a DMS-100 central office switch in a trailer located outside the exhibition hall.

For the first demonstration, a Sync Research, Inc. Frame Relay Network Access Controller (NAC/FR) supporting an asynchronous terminal and an IBM cluster controller was attached to a Universal Data Systems, Inc. (UDS) ISDN terminal adapter. The NAC/FR supports protocol conversion for the asynchronous terminals along with frame relay formatting.

The terminal adapter, using the IDSN Q.931 signaling standard, established a switched BRI B channel call to the Northern Telecom LPP.

The LPP port supporting the application was linked via a permanent virtual circuit to an IBM Application System/400 host in the trailer.

John Valentine, manager of market development for advanced data services at Northern Telecom, said the advantage of BRI access in such a configuration is cost.

"We're positioning it as something that's appropriate in a remote office, where the daily volume doesn't justify leased lines," he said.

Northern Telecom also demonstrated a Novell, Inc. NetWare client workstation accessing a NetWare server via frame relay.

Each device was attached to a different Ethernet and accessed the LPP via a 56K bit/sec link supported by Cisco Systems, Inc. routers and UDS ISDN terminal adapters.

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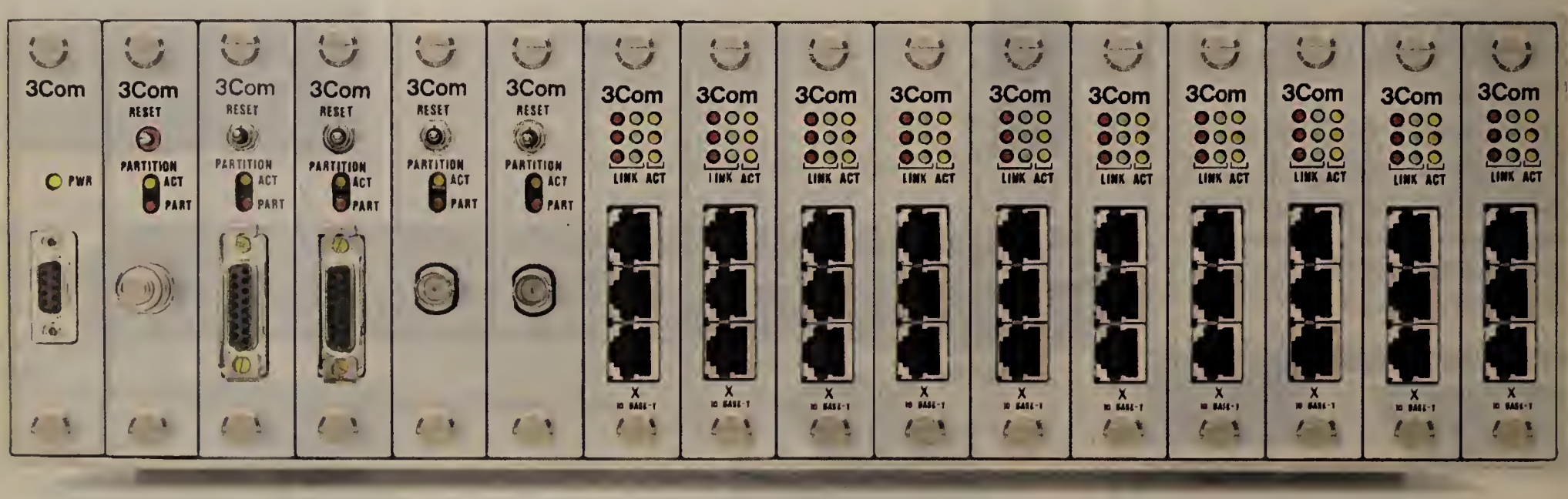

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Cable & Wireless brings E-1 to U.S.

continued from page 4

ton, D.C. Bill Rahe, the company's director of private lines and managed data services, said further deployment of the E-1 service will be based on user demand. The company runs a 19,000-route-mile network with 43 switching centers in the U.S.

Rahe said the company equipped NEC America, Inc. T-3 multiplexers in its network to support the E-1 service.

Catching user eyes

Users expressed interest in the new offering.

"It's definitely something we would look at and examine," said Edward Ziesche, international telecommunications administrative manager at Cargill, Inc., a processor and exporter of agricultural and chemical products. "We'll have to sit down and compare E-1 with current services to determine which is the best way to [proceed]."

Analysts applauded Cable & Wireless Communications' introduction of the domestic E-1 service.

"This service makes sense for users with global networks," said Mark LaRow, a senior manager at Ernst and Young, a Vienna, Va.-based consultancy. "You have E-1s overseas, and it seems a shame that when users hit U.S. soil, they have to get rid of six of their DS0s."

LaRow said he expects steady user demand for Cable & Wireless Communications' E-1 service and stressed the importance of offering a service that the company's rivals have not announced yet. "It may not be an overwhelming market success, but anything that differentiates interexchange carriers nowadays provides an edge."

Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy, agreed.

"The big problem European companies have with their networks is scaling them down to T-1 in the U.S.," Briere said. "As it stands, a good deal of bandwidth is wasted and throughput is limited."

Cable & Wireless Communications is offering a special limited-time promotion to launch the new E-1 service. Users that sign orders before Jan. 1, 1992, will receive a 5% discount with a one-year contract and a 15% discount with a five-year commitment.

Users can add an E-1 interface module to most T-1 multiplexers that enables the units to support E-1 service in addition to 1.544M bit/sec network services. But analysts point out that the E-1 modules are expensive. This could limit use of the Cable & Wireless Communications service.

The company guarantees service performance. The level of error-free seconds is 99.9% for a backbone E-1 link and 96.5% for an end-to-end link. And according to the carrier, the service will boast a 99.9% availability rate in a backbone configuration and 99.75% availability in an end-to-end link.

Cable & Wireless Communications declined to divulge pricing for the service but did say that the service will cost 30% to 40% more than its existing domestic T-1 service. The company said it was pressed to introduce the E-1 service by several large users it declined to identify.

FCC official backs unit

continued from page 4

share information on past outages and review its current service quality reporting requirements, which some users say are inadequate.

Additionally, Duggan suggested that the FCC set up a service similar to the "Miss Utility" program used by many electric and gas utilities. Under this program, construction workers are required to call a hot line any time they plan to dig at a site to receive information about buried lines.

But the most important change the FCC could make is to form an investigative team to probe into the cause of outages, Duggan said.

He suggested that the unit be patterned after the NTSB, which sends investigators to the scene of accidents, interviews witnesses, issues accident reports and formulates safety recommendations to prevent future crashes. Such activities are necessary to protect the network, he said.

"Establishing such a formal investigatory body would also have the important effect of reassuring the public — a public that has every reason to believe that no one is adequately monitoring and assessing telephone network failures," Duggan said.

Motorola adds to RISC 8000

continued from page 22

Personal Networking is Motorola's wireless Ethernet network, Altair, which is based on the company's Wireless-In-Building network technology.

In addition, Motorola is offering a Transmission Control Protocol/Internet Protocol Ethernet bridge and gateways for X.25, IBM's Systems Network Architecture and Digital Equipment Corp.'s DECnet.

Motorola is currently evaluating other networking products, such as Novell's NetWare for Unix and Open Systems Interconnection network products, but had no announcements of future products to make at this time.

Motorola's SMB/ix, PC Interface, PacerLink, Altair, Powerfusion and uShare products are available now. LAN Manager/X, the optional NetWare compatibility module, and PacerShare will be available in the first half of next year.

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Good protection comes cheap

continued from page 1

a wide variation in each program's effectiveness in actually extricating viruses from infected files.

Products were rated based on their ability to handle a number of virus infection scenarios, including boot-sector virus infections and file infections by common and exotic viruses. The product that outperformed all others was Fridrik Skulason's F-Prot, shareware that can be licensed for $1 a copy and is available on many bulletin boards.

F-Prot outpaced products that cost as much as $200 a copy.

Besides F-Prot, other strong performers identified in the test include Leprechaun Software International, Ltd.'s Virus Buster, S&S International's Dr. Solomon's Toolkit, Microcom, Inc.'s Virex-PC and McAfee Associates' Scan/Clean (see chart, this page).

Rating the products

NCSA's rankings are based on a series of tests developed and conducted by David Stang, the organization's director of research. His tests highlighted the performance of the virus removal tools under several general types of virus infections. Products earned points for how successfully they dealt with each of several virus infection scenarios.

First, Stang tested the products to see if the removal tool could detect a virus trying to infect the tool itself and whether the tool could remove such a virus. He installed a Jerusalem-B virus in a personal computer's memory and ran an uninfected copy of the removal tool from a floppy disk drive. The Jerusalem-B virus infects all COM and EXE programs as they are run and, therefore, will infect the removal tool when it is run.

In this test, the highest score a product could receive was five points, based on one point for each of the following:

- Detecting a virus in the tool itself as the program loads and reporting this to the user.
- Detecting the virus in memory and reporting the virus name.
- Removing the virus from memory and reporting the action taken.
- Automatically removing the virus from memory effectively enough so the removal tool still works.
- Detecting and removing the virus from other infected programs.

Only one product, Central Point Software, Inc.'s AntiVirus, received a perfect score in this test. Notably, F-Prot only received one point in this part of the test. When ran, F-Prot displayed the message "Alert! This program has been modified. Turn the computer off, boot from a clean diskette and run an original copy of this program."

For some users, this might be enough. "It could be argued that full credit should go to a product that reports its memory is infected, tells the user to reboot from an uninfected disk and refuses to run," Stang said. "However, as Central Point's AntiVirus demonstrated, more can be demanded of an antivirus product."

The next part of the test determined how the removal tools fared at detecting and removing boot-sector viruses on a floppy disk. The boot sector contains the instructions that load the operating system on a personal computer.

Each virus removal product was tested against four common and three exotic boot-sector viruses. A virus is considered common if it appears regularly in some part of the world. The four common viruses selected from the NCSA collection for this test were Ashar, Stoned, Disk Killer and Print Screen. The three exotic viruses chosen were Big Italian, Telecom and Typo Boot.

NETWORK SECURITY TEST SERIES

A product received one point for detecting each virus and one point for removing it. Perfect scores in the common and exotic boot-sector virus tests would be eight and six, respectively.

All of the products did a good job handling the common boot-sector viruses. When it came to the exotic virus test, F-Prot, AntiVirus and Dr. Solomon's Toolkit received perfect scores.

"If other exotic viruses had been chosen, the results may have been different," Stang cautions.

Next, he tested how well the virus removal tools would work on common and exotic file viruses. He selected 18 common and 18 exotic file viruses and gave each product one point for detecting a file virus, one point for removing it from the file on an infected disk and one point for deleting, or killing, the infected file from a second disk containing the infected file.

Products could earn a total of 108 points in the file virus tests.

F-Prot was a consistently strong performer in nearly all the file virus tests. The other strong performers — Leprechaun Software's Virus Buster, S&S International's Dr. Solomon's Toolkit, Microcom's Virex-PC and McAfee's Scan/Clean — were also fairly consistent throughout all the tests.

Others, notably Central Point's AntiVirus, IRIS Software and Computers, Ltd.'s Antivirus-Plus and McAfee's Pro-Scan, were consistently high in all tests except those that required actually killing the infected file.

Microcom's Virex-PC was strong in detecting and killing viruses, but it was not as strong as others in removing viruses from infected files.

Some people prefer a product that detects and deletes an infected file without the option of removing the virus from an infected file. "Some users do not believe in this process of 'cleaning' files," Stang said. "Instead, they would rather delete whatever is infected."

If that is the case, Stang suggests users might want to discount the points awarded for killing viruses and focus on the points awarded to other attributes of the tools.

The next portion of the test examined the quality of the virus removal. Some viruses will reinfect a program several times, each time increasing the size of the file.

However, some virus removal tools only remove one copy of a virus from an infected file. For a virus removal tool to be useful, it must return the program to its original size and the clean program must run normally.

To test the quality of removal, Stang created an executable file that performed several simple tasks, including clearing the personal computer's screen, beeping, printing "Hello World," asking for a disk directory and counting to 1,000 on the screen.

The compiled test file was 29,382 bytes and was infected three times with the Jerusalem-B virus, which would occur naturally if the program ran three times with the Jerusalem-B virus in memory. Each time the program was infected, the size of the file increased by 1,808 bytes.

Each virus removal product was run against this file, and the results examined the following:

- Were all copies of the virus removed from the file? Five points

NETWORK WORLD

Virus removal tool scorecard

Company	Product	Self-check with Jerusalem-B Virus	Boot viruses		File viruses							Master boot record viruses	Score
			Common boot viruses	Exotic boot viruses	Common file viruses			Exotic file viruses			Quality of removal		
					Detect	Remove	Kill	Detect	Remove	Kill			
Central Point Software, Inc. Beaverton, Ore. (800) 445-2110 BBS: (503) 690-6650	AntiVirus	5	8	6	18	15	1	17	13	1	12	3	99
Computer Consulting Group, Inc. Ashland, Ore. (503) 488-3237	Virus Clean V2.10, Release A	4	6	3	8	8	8	5	4	5	12	3	66
S&S International Berkhamsted, England 44-442-877877 BBS: 44-494-724946 Also available from: OnTrack Computer Systems Eden Prairie, Minn. (800) 872-2599	Dr. Solomon's Toolkit V5.15	1	6	6	17	14	10	17	12	5	12	3	103
IRIS Software and Computers, Ltd. Givataim, Israel 92-3-5715319	Antivirus-Plus V3.7, Release 15.7	3	6	3	13	12	0	6	6	0	12	3	64
Leprechaun Software International, Ltd. Marietta, Fla. (800) 521-8849 BBS: (404) 971-8886	Virus Buster V3.75	3	8	3	18	8	18	17	11	17	10	3	116
McAfee Associates Santa Clara, Calif. (408) 988-3832 BBS: (408) 988-4004	Scan/Clean V7.6V80	2	8	5	18	12	6	18	5	13	12	3	102
	Pro-Scan V2.32	3	8	4	14	13	1	16	11	5	12	3	90
Microcom, Inc. Durham, N.C. (919) 490-1277	Virex-PC V2.00b	4	6	4	18	4	18	18	3	18	7	3	103
Symantec/Peter Norton Computing Santa Monica, Calif. (800) 441-7234 BBS: (408) 973-9598	Norton Anti-Virus V1.5	1	6	2	17	13	17	13	8	13	5	3	98
Fridrik Skulason Reykjavik, Iceland Available from many BBS systems as shareware	F-Prot V2.0	1	8	6	18	15	17	17	15	17	12	3	129
XTree Company San Luis Obispo, Calif (805) 541-0604	ViruSafe V4.50	4	8	2	18	11	7	17	5	12	12	3	99
Perfect score		5	8	6	18	18	18	18	18	18	12	3	142

BBS = Bulletin board system

SOURCE: NATIONAL COMPUTER SECURITY ASSOCIATION, WASHINGTON, D.C.

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were awarded for complete removal.

■ What was the resulting file size? The file size should be 29,382 bytes, but rounding to the nearest 16-byte segment would make a 29,392-byte file acceptable for an executable file. Two points were awarded if the file was returned to the proper size.

■ Did the program still run as it did before the infection? Each product received five points if it passed this test.

Most products earned a perfect score in this test. The exceptions were Symantec/Peter Norton Computing's Norton Anti-Virus, which only removed one copy of the virus, and when repeatedly used to remove all three copies of the virus, it reduced the file size to 29,392 bytes; Microcom's Virex-PC, where the cleaned file could not be run after the program was returned to an uninfected state; and Leprechaun Software's Virus Buster, which lost two points even though the clean version of the program was able to run because the restored file size was 29,408 bytes.

Finally, Stang tested whether the virus removal tools were effective against master boot-sector infections on a hard disk. This test is similar to the boot-sector test above, however repairing a master boot sector is more difficult than repairing a floppy disk's boot record.

According to Stang, master boot-sector viruses represent a very serious problem to users. The DOS FORMAT program does not modify the master boot sector of a hard disk. As a result, a user who tries to kill the virus by reformatting the entire disk destroys everything on the disk but the virus.

For this test, Stang used Stoned, the most common virus to infect a master boot sector. The personal computer was booted from a clean, uninfected floppy disk. The virus removal tools were awarded one point for successfully detecting the virus, removing it from the infected master boot sector and if the hard disk would boot normally after the virus was removed.

All 11 products passed this test with flying colors.

Selecting a product

All together, a perfect score would be 142 points. F-Prot, the best of the group, scored 129. It was a consistently strong performer in almost all of the tests. With a price tag of $1 per license, it's also the best buy.

Despite F-Prot's strong performance and great price, it might not be the right product for everyone. "If your company has been hampered by a particular virus, you might want to ignore everything in the table except the columns that evaluate how the tools deal with that type of virus," Stang said.

Another factor to consider is that F-Prot is shareware and not distributed in the conventional manner. It can only be obtained by writing to Fridrik Skulason in Iceland or by downloading the program from bulletin board systems (BBS).

Some companies, fearing virus infection, have policies that do not allow users to download programs from a BBS. And because it is shareware, the product does not come with the complete user manual that is generally included with software packages.

The commercially available packages offer a detailed manual and many provide around-the-clock technical support through a BBS and, in most cases, through a customer service hot line. And while many of the products carry higher price tags than F-Prot, Stang believes the pricing may be more reasonable when large-site licenses are negotiated with the manufacturers.

According to Stang, master boot-sector viruses represent a very serious problem to users.

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This test, the first in the *Network World*/National Computer Security Association (NCSA) Network Security Test Series, was conducted by the NCSA. The association's mission is to help users improve the security of their information systems, reduce the threat of computer viruses and ensure the integrity of their information resources. To achieve its goals, the NCSA conducts research on security, virus and data integrity problems, evaluates products, and presents its findings to the public.

A comprehensive report on virus removal tools, including the results published in this article and additional findings, can be purchased from the NCSA for $75 ($44 for members).

NCSA can be reached at 227 W. Main St., Mechanicsburg, Pa. 17055, or call (717) 258-1816 or fax to (717) 243-8642.

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Motorola builds umbrella for net

continued from page 1

up time so the group can turn its focus to expanding the local-area network infrastructure rather than running the network.

Creating a standard

Motorola's Communications Sector — which earlier this year was split into the Land Mobile Products Sector and the Paging and Telepoint Systems Group — formed the team three years ago to create a company standard for LAN design and to implement a LAN internetwork for some 460 sites worldwide. Those sites house about 22,000 workstations and 1,000 LANs.

At the design team's pilot site here, which houses some 3,300 workstations and 70 LANs, the group has installed a LAN architecture based on unshielded twisted-pair wire and fiber optics that is supported by more than 100 SynOptics Communications, Inc. wiring hubs and eight Cisco Systems, Inc. routers.

Unfortunately, Motorola's efforts to expand its LAN vision have been stalled by the demands of the pilot site, Simone said. Although the design team would have liked to have implemented the new LAN architecture in half of the communications product groups' sites by now, it started losing momentum once it got to about its 20th site.

"Our most talented network design people have been getting sucked into the operation and support of the network," he said. "When that happens, there's no one left to do the design and implementation."

Net management umbrella

Motorola went shopping for an off-the-shelf umbrella net management system that could alleviate the problem by automating some net management tasks. But when it came up dry, it chose to build a system using tools from software developers.

Gignac said he hopes to get management approval within two months for the network management software, which could initially cost as much as $100,000.

"The big vendors are carrying too much baggage in that they have developed one-size-fits-all network management systems," Gignac said. "They aren't flexible in delivering customized systems for our particular needs."

Key components sought by Motorola for CAND were a relational database for handling the correlation of network alarms, providing historical data and taking actions to remedy network problems, as well as support for SNMP and the Common Management Information Protocol, Gignac said.

CAND would treat Novell, Inc.'s NetView, Sun Microsystems, Inc.'s SunNet Manager and assorted element managers as "input and output subsystems" for managing routers, hubs and other devices on the network, Gignac said.

> "The umbrella in no way replaces the need for solid SNMP management."
>
> ▲▲▲

These subsystems would collect alarms and traps from network devices — when a predetermined threshold is exceeded, for example — and pass corresponding data to CAND's correlation engine, he said.

The correlation engine would filter alarms to determine which need to be addressed, Gignac said. It would then pass this information on to an event tree that would ready the data for problem analysis.

The problem analysis process would involve referring to a knowledge base that would be used to determine what action should be taken for a particular problem. The problem analysis component would also prioritize actions to be taken and execute those actions, such as the resetting of a device, he said.

If the action taken did not fix a problem, CAND would try several more times before alerting an operator with either a visual or audio signal.

Reports and histories of net events could be generated from information sent to the event tree by the correlation engine, Gignac said.

CAND would eliminate as much human intervention as possible and get smarter over time as more rules are added to its knowledge base, he said. Use of structured LAN topologies should simplify problem resolution in that a finite set of actions will solve most problems.

Can't live by SNMP alone

As Motorola's LAN team is moving toward implementation of CAND, it is also getting ready to install a new SNMP network management system based on SunNet Manager, Simone said. SNMP would be one of the main element managers under CAND, and Motorola plans to migrate all SNMP-capable devices to this management system by year end, he said.

For the past few months, Motorola has been running beta releases of a new SunNet Manager offering and a new SynOptics LattisNet Manager for Unix net management product that runs on top of SunNet Manager. It hopes to get management approval next month to deploy those systems, Gignac said.

Motorola is also close to buying SynOptics' LattisNet Network Control Engines, which are distributed SNMP-based management devices.

"The umbrella in no way replaces the need for solid SNMP management," he said. "It would be like having a CEO with no other managers in the company."

On the other hand, SNMP has shortcomings as an umbrella management system, Simone said. One is that it is a very high level tool that only trained network engineers can manage.

SNMP is, however, an important step along the way to implementing a system with enough sophistication to enable skilled operators to handle most net management tasks.

"We want to lower the minimum skill set needed to run our network," Simone said. "Today, the minimum skill set needed is extremely high."

Apple, IBM flesh out integration

continued from page 1

The blueprint covers Macintosh support in SNA nets from a multitude of points, addressing the microcomputer as a client workstation in token-ring nets. It enables a Macintosh to support IBM's Advanced Peer-to-Peer Networking (APPN) protocols in order to improve access to IBM resources across an enterprise and to monitor and control Macintoshes whether they reside on a token ring or an AppleTalk net.

Products resulting from the relationship will be offered and supported by the company that developed them.

One of the vendors' first objectives is to build AppleTalk support into IBM's version of the OS/2 operating system. The resulting product will allow Macintosh, OS/2 and DOS-based personal computers to share files, query databases and access a range of communications services via a common OS/2 server.

To help achieve this, Apple will license its AppleTalk protocols to IBM for inclusion in OS/2. This will give Macintosh users full access to all services provided by an OS/2 server.

"We intend to put AppleTalk into OS/2 as a transport, like NETBIOS," said Ed Daniels, system manager of enterprise LAN communications at IBM. "This way, all services available to OS/2 workstations will be available to Macintosh clients. They will be equal partners."

On another front, Apple said it has licensed IBM's Token-Ring chip technology and subsequently unveiled its Token Ring 4/16 NB Card, an adapter based on IBM's Token-Ring technology that connects Macintoshes to a 4M or 16M bit/sec token-ring local-area network.

Apple said the new card will be available in December for $999.

Hancock also mentioned plans to extend IBM's APPN capabilities to the Macintosh. Specifically, she said IBM would offer APPN end-node capabilities for the Macintosh, a move that would let Macintosh clients establish peer-to-peer connections to a range of IBM devices without routing traffic through a host or front-end processor.

However, Hancock said IBM would not extend APPN network node support to the Macintosh, which would eliminate the need to pass through an IBM "routing" node.

Bill Brown, product manager for communications products at Apple, pointed out that network node support is more appropriate for router vendors. "But even with only end-node [capabilities], any user can have complete access to all others on the network," he said.

Without network node support on a Macintosh, the microcomputer will require an IBM device to act as the routing mechanism.

APPN support would be a boost for Macintosh users, who are currently limited to SNA access via 3270 or 5250 terminal emulation or custom gateways.

On the network management front, Apple plans to offer Macintosh and AppleTalk net management through IBM's LAN Network Manager and NetView management systems. A Simple Network Management Protocol (SNMP) agent, which Apple plans to release soon, will communicate alerts to either net management package, according to Brown.

"We're working on an SNMP agent to embed into the Macintosh operating system," Brown said. With this, IBM's LAN Network Manager will be able to collect management statistics from Macintosh clients connected to IBM Token-Ring Networks. Under another option, LAN Network Manager could relay SNMP statistics to a NetView central management console.

Apple said it plans to release a version of its SNAps SNA net management software to collect SNMP statistics from the Macintosh network and send the data to a NetView central management console. Both vendors also pledged to broaden the capability of a Macintosh to access data residing on IBM's Application System/400 mid-range systems.

According to Brown, IBM will extend to the Macintosh its PC Support services, which are currently provided by the AS/400 to DOS and OS/2 clients. PC Support services lets LAN-attached client workstations access 5250-type terminal emulation as well as cooperative processing services to reach data on AS/400 servers. Extending the PC Support services to the Macintosh will enable users to position the device as a database server to Macintosh clients workstations.

Apple also hatched a plan for an Open Collaboration Environment (OCE), a specification in which Apple plans to provide a complete set of programmatic interfaces within its System 7 operating system. These will serve as a link to a common set of communications services that will serve as the network underpinnings for development of net applications.

The services will provide developers with common transport, directory and security services on top of which they will build their applications to ensure interoperability with other vendors that support the core services.

Spindler said OCE will unite electronic mail applications from different vendors, as well as enable developers to build collaborative computing applications such as work flow automation packages.

Apple said it will announce further details about OCE early next year.

API group aids imaging users

continued from page 2

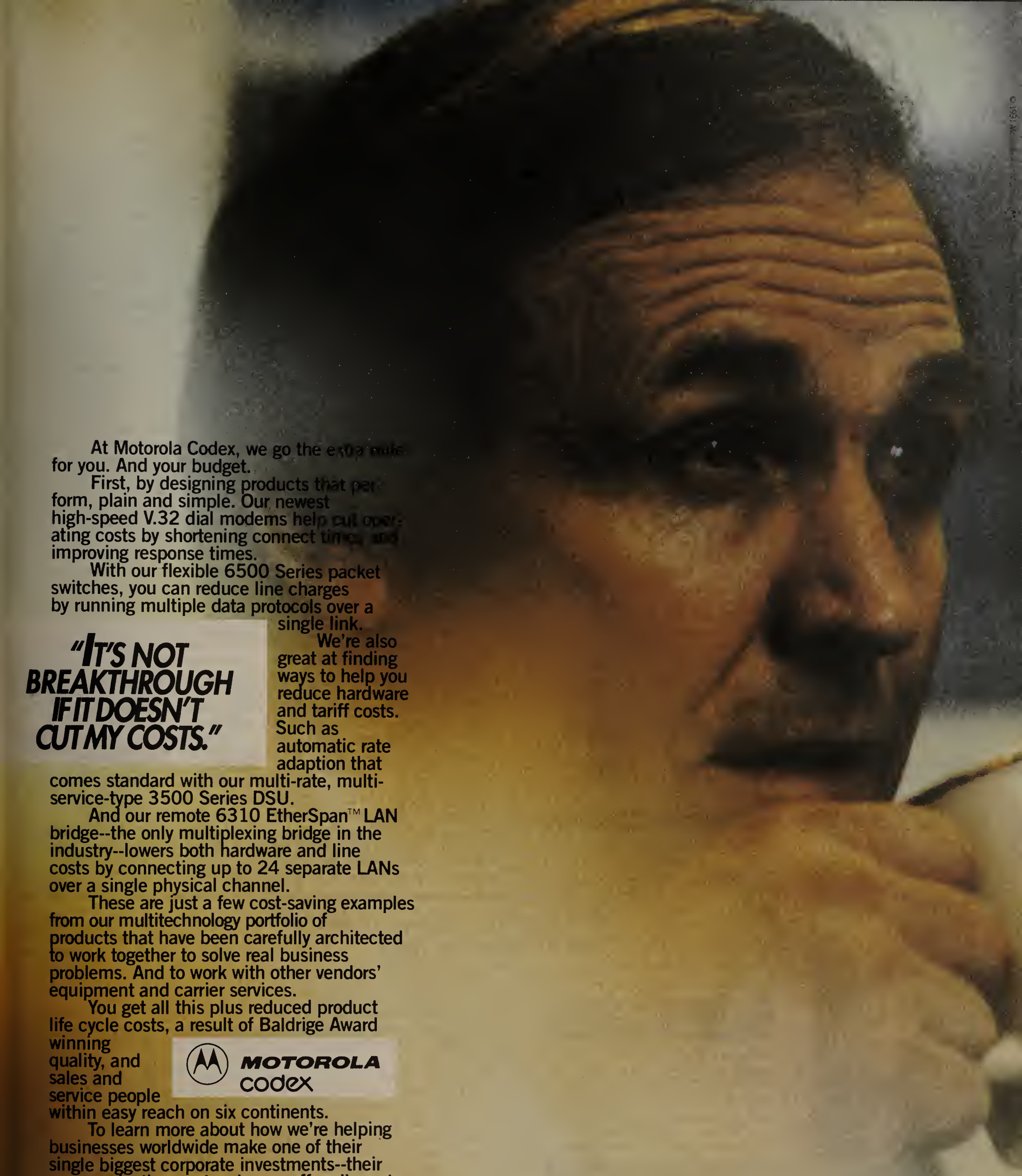
under Apple Computer, Inc. Macintosh Version 6.05 and above, as well as Microsoft Corp.'s Windows 3.0 and higher. By writing to CLASP, software developers can offer direct support for a variety of imaging systems within a single application and without writing a variety of drivers, as is the case now.

"By supporting CLASP, software developers can focus their engineering talents on improving product capabilities, rather than writing and rewriting scanner driver code," said Larry Miller, vice-president of marketing at Caere.

Using software written to CLASP, end users will be able to retrieve images directly from scanners or image databases without having to close out of the application, significantly speeding and easing the image importing process. The vendors said that by easing this process they hope to encourage more widespread use of imaging.

Several companies have already pledged to support the CLASP specification, including Canon U.S.A., Inc., Corel Systems Corp., Diamond Flower Electric Instruments Company, Inc., Hammerlab Corp., Howtek, Inc., Image-In, KYE International, Inc., Letraset Graphic Design Software, Marstek, Media Cybernetics, Inc., Microtek Lab, Inc., Mouse Systems Corp., Nikon, Inc., Nisca, Inc., Software Architects, Inc. and The Complete PC.

CLASP is currently open to comment by the coalition members and is expected to be finalized by year end.



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IBM enters multimedia fray

continued from page 2

The product is designed to work with PS/2 Models 30-286 and above, as well as with IBM's newly announced PS/2 Ultimedia Model M57 SLC. The M57 is based on a high-performance 386 SLC microprocessor and includes multimedia features such as a standard audio card, an extended graphics adapter card and CDROM drive. Available at the beginning next year, the PS/2 model lists for $5,995.

With PS/2 TV, users can devote the entire PS/2 screen to video or watch broadcasts in a small window, called a Picture in Picture display, which occupies about one-ninth of the screen. This enables users to continue working on an application, such as a spreadsheet, while monitoring a video broadcast.

Users can switch video channels and adjust volume, brightness and color from their keyboards. They can also turn off the picture and monitor the audio portion of the program, or monitor the picture and turn off the sound. The PS/2 TV includes an integrated speaker as well as an industry-standard headphone jack.

The PS/2 TV can be used with any software or operating system. It will be available in the first quarter of 1992 for $495.

As part of the PS/2 TV announcement, IBM unveiled a connection device called the F-Coupler that attaches the PS/2 TV to a Token-Ring local-area network.

The F-Coupler enables the PS/2 TV to send data, video and audio signals over the network, allowing users to share the same video feed. Because audio and video signals are transmitted over frequencies that differ from data, the combined transmission does not impact data rates, IBM said. The F-Coupler can support as many as 71 channels on the Token-Ring LAN that is supporting data, with multiple users viewing the same channel at any one time.

IBM also unveiled Person to Person/2, a PS/2-based conferencing system that allows PS/2 users on Token-Ring Networks, Ethernets or Integrated Services Digital Networks to share motion video, still pictures, charts and files in real time.

The product consists of conferencing software and one of two video cards: IBM's new ActionMedia II, which converts video signals into digital data, or the M-Motion Adapter/A, which works in analog mode. The system also requires some type of input device, such as a camera or a videocassette recorder, that attaches to the video board in the PS/2.

Using the system's Person to Person File Transfer feature, users can send files while viewing a copy for discussion. The application also has a Remote Pointer feature, which enables customers to use their mouse for pointing out details on screen at the other end of the conference link.

Person to Person/2 is currently being offered to select IBM customers and is not generally available. IBM declined to provide pricing.

DECmcc pack to undergo face-lift

continued from page 1

ware Systems handles licensing of DECnet Phase IV products to OEMs and systems integrators for DEC. Mike Silton, product marketing manager for Bell Atlantic Software, said DEC is looking to expand its ONL relationship with his company and confirmed that licensing DECmcc Director through Bell Atlantic Software is under discussion.

Bell Atlantic Software will develop extensions for the product to make it operating system-independent if the expanding licensing agreement is worked out, Silton said.

DECmcc Director is the cornerstone of DEC's Enterprise Management Architecture (EMA), an Open Systems Interconnection-based blueprint for managing networks and systems from multiple vendors. It performs configuration, fault, performance, accounting and security management through a common user interface.

DECmcc Director currently runs under DEC's proprietary VMS operating system. The company pledged to port the system to Ultrix, its version of Unix, when it was introduced two years ago.

By porting DECmcc Director to Ultrix, DEC is accommodating users that do not want to be locked into a proprietary platform for network and systems management. Ultrix users will also be able to run the DECmcc Director on an existing Unix platform instead of purchasing a VMS node.

DEC currently offers the DECmcc Management Station on Ultrix, a non-EMA compliant system that consolidates several DECnet Phase IV management products and presents them through a single DECwindows interface.

"DEC realizes that Unix is a trend that's unstoppable," said Mark LaRow, a senior manager at Ernst & Young, a Vienna, Va., consultancy. "Unix is a platform not just for scientific computing, but for business computing. They don't want to be caught off guard like they were with the PC and TCP/IP."

DEC demonstrated an Ultrix version of DECmcc Director two weeks ago at INTEROP 91 Fall in San Jose, Calif. The product is undergoing internal testing and will be ready for field trials in a month or two, company officials said.

When it is ready for commercial release, the Unix-based DECmcc Director and the next version of the VMS-based product will include a new alarm windowing capability that provides additional detail in the alarm notification.

At the Telecom 91 Exhibition and Forum held recently in Geneva, DEC demonstrated a specially tailored version of the Ultrix-based DECmcc Director that is designed to help carriers manage their networks. Dubbed the Telecommunications Network Management Program (TNMP), the system enables carriers to increase network reliability and service quality by helping them control disparate network elements and management systems from a single console. It will provide configuration, fault, performance and security management, and authentication services.

Pricing for TNMP, which is expected to be available in mid-1992, has not yet been determined.

DEC also plans to port DECmcc Director to the OSF/1 operating system when it begins to migrate Ultrix to OSF/1. The company does not, however, view the Open Software Foundation, Inc.'s (OSF) Distributed Management Environment (DME) as a competitive threat to the Unix-based DECmcc Director, said Dennis Biedrzycki, DEC's network management marketing manager.

"DECmcc [Director] is complementary [to DME] and will be integrated with it," Biedrzycki said. "[DECmcc] Director will address areas that the OSF environment does not."

LaRow added, "DEC's playing for the hearts and minds of the Unix people. If they deliver, they might be able to sell quite a bit of EMA into the Ultrix base in the time it takes DME to emerge."

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continued from page 6

and Transmission Control Protocol/Internet Protocol network environments.

A token-ring board supporting TCP/IP, AppleTalk and Systems Network Architecture protocols is available as an option for $2,500.

The AV 4320 includes all the features of the AV 4300, but it is a dual-processor version of the server. It delivers 58 MIPS of performance and can perform symmetric multiprocessing, in which each processor can perform computer or I/O tasks simultaneously, significantly speeding up performance. Both models are designed to handle 16 to 48 simultaneous users.

Available now, the AV 4300 configured with 16M bytes of memory, a 332M-byte magnetic disk and 525M-byte cartridge tape unit costs $13,995. In the same configuration, the AV 4320 is priced at $19,995.

Unisys' low-end Unix server, the U 6000/35, also runs under Unix System V Release 4, but it is based on a 33-MHz Intel 80486 microprocessor. The U 6000/35 delivers up to 30 MIPS and can support as many as 64 simultaneous users, although the company recommends between 12 and 40 users for optimal performance.

The U 6000/35 is designed to replace the company's previous low-end server, the U 6000/31, which was based on an Intel 80386 microprocessor and supported an earlier version of Unix.

The U 6000/35 features a 32-bit Extended Industry Standard Architecture bus and comes with 8M bytes of memory, expandable to 64M bytes. It offers between 168M and 1.3G bytes of internal disk storage, a 150M-byte, ¼-in. tape drive and a 1.2M-byte, 5¼-in. disk drive.

The U 6000/35 comes with Unisys' Open/OLTP software, which implements the X/Open Company, Ltd.'s Distributed Transaction Processing standard and incorporates X/Open's XA protocol for two-phase commits, enabling users to update multiple distributed databases simultaneously. This makes the server ideal for distributed transaction processing environments, the company said.

Available now, the U 6000/35 costs $13,895 and comes configured with 8M bytes of memory, a Small Computer System Interface parallel printer port, two RS-232 asynchronous ports, two RS-232 ports that can be configured for synchronous or asynchronous links, 168M bytes of internal disk storage, the 150M-byte tape cartridge and 1.2M-byte disk drive.

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Banyan adds Mac support to VINES

continued from page 1

staff manager at New York Telephone Co., which employs both Intel Corp.-based microcomputers and Sun Microsystems, Inc. Unix-based workstations.

New York Telephone wants to hang Sun SPARCstations on its VINES nets. "We are pressing [Banyan] to do just that," Troup said.

Banyan announced it has licensed AppleTalk protocols and built them into two software options that run alongside VINES 5.0 on a server. VINES Option for Macintosh connects an unlimited number of Macintosh clients to a VINES server. This provides for basic AppleTalk routing and Macintosh access to printers, file services and other resources on a VINES network.

The software also enables a Macintosh client to use the Chooser option to access VINES services and extends VINES security to Macintosh clients.

VINES Option for Macintosh also supports AppleTalk tunneling, in which AppleTalk packets are encapsulated in VINES packets allowing Macintosh users on one AppleTalk net to access AppleTalk resources on another net by sending requests over the VINES local-area network.

The second option, VINES Mail for Macintosh, enables Macintosh users to create, address, read and send electronic mail to other VINES Mail users. As with VINES Option for Macintosh, the E-mail software is tied directly to security, timing, messaging and communications services on the VINES server.

Because of AppleTalk support at the server, no additional software is required at the Macintosh client since the existing user interface and familiar conventions of Apple's AppleShare are used.

When Banyan first encountered the prospect of supplying full Macintosh support over two years ago, the vendor decided it had to rework its file system. By only supporting limited protocols, file formats and access methods at the server, Banyan saw that the existing file system would inhibit the ability to extend network services across different client workstations.

Anand Jagannathan, president of Reach Software, Inc., as well as an early architect of VINES and a founder of Banyan, said the new file system, VINES File Store, was designed to accommodate additional clients and operating systems.

"Banyan needed to rearchitect VINES to open up the file structure and support additional protocols at the server so they could handle different kinds of file requests," he said.

VINES File Store comes with built-in support for AppleTalk Filing Protocol and Server Message Block extended message support for OS/2 workstations. This enables diverse workstations to access the same data and applications.

In addition, the new file system comes with expanded VINES access rights, extensions to backup and restore capabilities and new file, copy, directory and naming commands.

Banyan also offered a new VINES print service that offers improved administrator control, an increase from 10 to 20 in the number of print services supported per server and new spooling features, among other functions.

In the interest of meeting its pledge to deliver Macintosh support by year end, Banyan has created some concern and confusion among users because VINES 5.0 is incompatible with its Release 4.11, which came out only a few weeks ago. VINES 4.11 was intended to provide certain large users with needed features, such as support for new servers, diskless workstations and X.29.

Banyan said it will offer a new release next year that will bring the two versions back in line. In the meantime, David Mahoney, Banyan's president and chief executive officer, said users can get the functionality in both releases by running multiple versions of VINES over interconnected VINES networks.

Although analysts and users applauded the comprehensive Macintosh support, they openly questioned Banyan's decision to go forward with Version 5.0 to make good on a promise of Macintosh support when it will force some users to juggle upgrades caused by the incompatibility with Release 4.11.

Banyan said VINES 5.0 will ship by year end. Pricing for Version 5.0 varies. VINES SMP costs $13,995, VINES Unlimited is priced at $7,495 and VINES TEAM costs $2,495.

VINES Option for Macintosh costs $1,995, while VINES Mail for Macintosh is priced at $895. As part of an introductory offer, customers who order VINES Option for Macintosh will also receive VINES Mail for Macintosh at no additional cost through February.

Red Cross plans backbone net

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tribution service, enabling more detailed and efficient forecasting of blood product needs. Today, forecasting is performed on a regional basis.

The network will also provide access to what will be the world's largest blood information database. The Red Cross is currently developing this database, which will enhance the organization's strategic planning and research. It will also simplify national donor recruitment procedures, thereby improving the nation's blood supply in times of shortages and providing split second information on donors with rare blood types.

The Red Cross is currently putting together a network design team, comprising both internal and external software and hardware experts, and will be forming the preliminary design over the next two to three months.

As an interim measure, the Red Cross will be installing, where necessary, the mainframe and software system currently used in its Boston Blood Service center until the network is finalized and can be put into operation nationwide, according to the organization.

Sun, Novell team on project

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try report published out of Salt Lake City. "If they want to be involved in personal computer-based networks, they have to participate with Novell."

Under terms of the agreement between SunConnect and Novell, the NetWare SunLink product will be among the first versions of NetWare for Unix (formerly Portable NetWare) that will provide all the basic services included in the latest version of NetWare, Version 3.11.

This means Unix services will be integrated with NetWare to provide client workstations with access to Open Network Computing/NFS resources. It will also provide an additional layer of Unix security beyond NetWare.

Net management is another area where SunConnect hopes to work with Novell. With its Unix-based SunNet Manager network management software, Sun is expanding the scope of the product to manage other networking environments and will work to bring NetWare into the fold.

Both companies are working to convert current Intel-based NetWare Loadable Modules, third-party add-ons to NetWare, into Unix tasks that can extend the functionality of NetWare for Unix. This is possible because both Sun and Novell support a transport-independent remote procedure call technology, which lets developers write a single networking application that can run in different networking environments over various protocols.

Darrell Miller, executive vice-president for Novell, said this agreement is evidence of the company's strategy to consolidate various versions of NetWare so it can offer the same product functionality across different operating system environments by merely recompiling the base source code.

For his part, Schmidt would not comment on any plans for SunConnect to port other network operating systems to Sun's SPARC servers. Although he said there were discussions with Microsoft Corp. and Banyan Systems, Inc., SunConnect was content to hook up with the market leader for now.

The NetWare SunLink product is scheduled to be available in mid-1992. Pricing will be announced in the future.

Net struggling in one-stop mart

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DBP Telekom did not join Syncordia but if it did, the carrier would continue to work with Infonet. "If they join Syncordia, they will use Infonet to cover those customers not served by Syncordia," Collazo said. "And if they don't join Syncordia, they will use Infonet to compete against Syncordia."

Berge Ayvazian, vice-president of communications research at The Yankee Group, a Boston consultancy, said France Telecom and MCI are trying to persuade DBP Telekom to stick with Infonet instead of joining Syncordia. But he added that DBP Telekom officials are concerned that they don't have enough management control over Infonet.

Ayvazian also said DBP Telekom is worried about the large investment required to join Syncordia. DBP Telekom officials, who requested anonymity, would only say the carrier is evaluating its strategic alternatives.

According to Ayvazian, Infonet's owners are considering ways to address DBP Telekom's concerns.

Approaches under discussion include consolidating management control of Infonet. This could mean, for example, having DBP Telekom, France Telecom and MCI acquire larger ownership stakes while other Infonet owners would reduce their shares. France Telecom and MCI officials were unable to comment on this by press time.

No unilateral competition

Meanwhile, Collazo said Infonet is struggling to convince its owners to stop marketing global private network outsourcing and facilities management services that compete with it. Even when Infonet's owners are acting alone and not as part of a consortium, Collazo said they sometimes sell outsourcing services in competition with Infonet.

Collazo added that the global outsourcing market will become more competitive as other carriers launch outsourcing ventures.

One of these is AT&T, which Collazo said is attempting to build a pan-European network to provide private network and value-added services.

At a press conference preceding the Telecom 91 Exhibition and Forum in Geneva earlier this month, AT&T Chairman Robert Allen denied rumors about plans to build a pan-European net, but he added that AT&T could build such a network if customer demand developed.

MCI plans move in on FTS 2000

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GAO report found that the GSA had failed to bring prices in line with commercial rates during interim negotiations with the carriers. He also said he is exasperated that, to his knowledge, the government has made no effort to collect the overpayments from the FTS 2000 carriers.

MCI said the best way to solve the problem is to do away with current rules that require agencies to purchase service from FTS 2000. Over the next six months, MCI will try to generate support on Capitol Hill to have the mandatory use rule removed.

"If you didn't have mandatory use," Edgerton said, "then it would be incumbent on the vendor to provide services at fair and reasonable prices."

NETWORK WORLD

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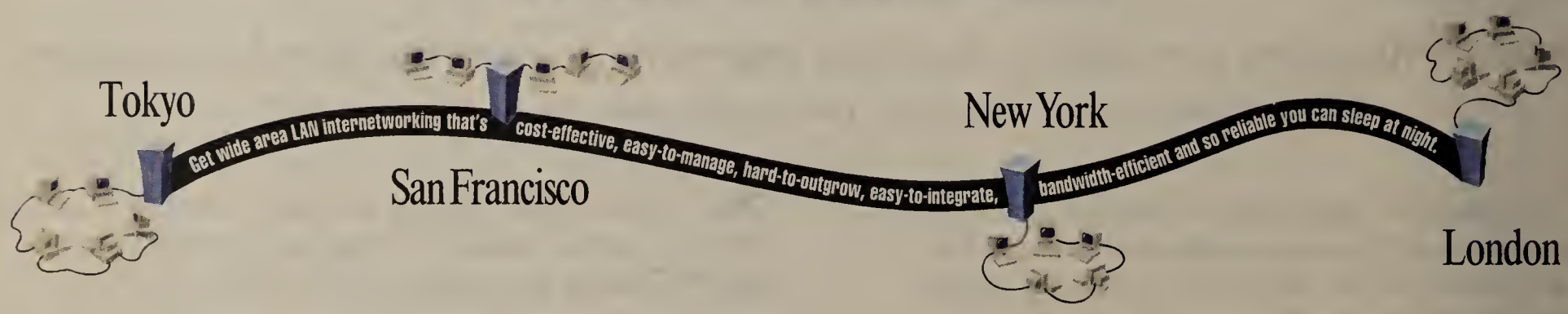

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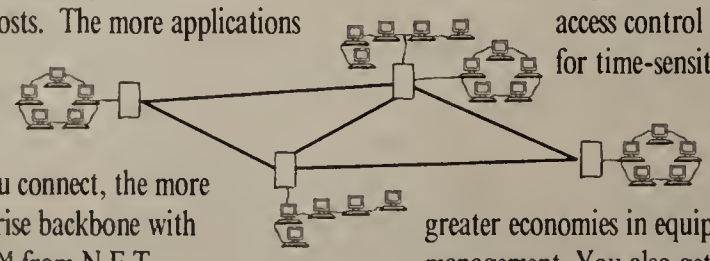

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